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Brown Company Files Reorganization Plan

The Plan Contemplates No Reduction in Principal and No Impairment of the Lien Position for the Bond Holders — Financing of $12,500,000 Is Proposed For Working Capital and To Expand Production Facilities.

PORTLAND, Me., August 9, 1937—The first major step toward termination of the trusteeship of the $75,000,000 Brown Company was taken today by Orton B. Brown, vice-president and treasurer, who filed a plan of reorganization for the 85-year old concern with the Federal District Court here. The Brown Company is one of the country's largest pulp and paper manufacturers with plants in New Hampshire and Quebec, employing more than 7,500 persons.

The plan, contrary to treatment accorded security holders in numerous reorganizations emerging from the recent business depression, contemplates no reduction in principal and no impairment of lien position for bondholders, and further would provide payment in cash of all past due interest, together with interest on interest. Preferred stockholders likewise would retain their present equity, and in addition, receive a larger stock interest and voting privileges to compensate for dividend arrears.

Because estimates indicate a 1938 demand for Brown pulp, especially the highest grades, at least 50 per cent in excess of possible output of present plants, the plan states new financing of $12,500,000 is proposed for working capital and to expand production facilities.

A $6,500,000 issue of 3½ per cent to 5 per cent serial bonds by the company's Canadian subsidiary, Brown Corporation at La Tuque, Quebec, and $6,000,000 in unsecured 5 per cent convertible serial notes of the parent Brown Company at Berlin and Gorham, N. H., would be sold to the Canadian underwriting houses of Wood, Gundy & Co., Ltd., and McLeod, Young, Weir & Co., Ltd. They have agreed to purchase these issues at 95 and 97, respectively, provided that the plan's approval by security holders and the court is obtained before October 1, 1937.

Treatment of creditors and security holders under the proposed plan would be as follows:

Present 5½ per cent first mortgage bonds, series A and B, outstanding in the amount of $21,415,500 would be exchanged for new bonds par for par, with same interest, same maturity date and secured by the same properties. All past due interest and interest on this amount too, amounting to $2,643,292 as of May 15, 1937, would be paid in cash.

The present 6 per cent preferred stock, par $100, $10,000,000 outstanding, would be exchanged for one and one-fifth shares of new 5 per cent cumulative preferred stock, stated value $100. The new preferred would be entitled to cumulative dividends from May 1, 1937, at the rate of $5 a year, except that in the first two years directors could pay dividends in additional preferred stock instead of cash.

A further bonus to present preferred stockholders in the form of one share of new common stock for each share of old preferred is authorized in the plan. Receipt of this stock together with voting privilege which would be attached to the new preferred stock would give preferred stockholders a voice in the management for the first time.

Present common stock, no par value, would be exchanged for five shares of a new common, par $1 or less, making a total of 2,000,000 shares outstanding after consummation of the plan. Certain common shareholders have agreed, however, to accept 100,000 fewer shares in order to provide the common stock bonus for preferred stockholders.

General claims against the Brown Company in the form of notes and accounts payable, which aggregate with interest approximately $1,530,462, would be settled by payment of 50 per cent of all outstanding claims in cash and 50 per cent in non-interest bearing notes maturing one-third each in two, three and four years. It is believed that approximately $750,000 of such notes would be issued.

The plan provides for the representation of outside interests on the board of directors of the new company for the first time by an expansion of the board to 11 members, four to be directors of the present company and seven representatives of active new business and financial interests in the affairs of the company. Since the organization of the present company which was incorporated in 1888 to succeed a company formed in 1852, the entire voting stock and directorship of the company has been in the Brown family. Orton B. Brown has been serving as trustee with R. H. Spaulding and W. B. Skelton of Lewiston, Me., since 1935.

Commenting on the necessity for this expansion the plan contains data of significance to observers of the trends in pulp and paper. It reads:

"The very large and steady growth of the esterification industry at the present time, including rayon,

(Continued on page 50)

International Reports Increased Profits

For First Six Months Operations Show Net Profit of $5,032,693 Compared With a Profit of $262,542 for the First Six Months of 1936 Which Would Have Been Greater Except for the Change in Handling of Inventories.

In submitting to stockholders the statement of consolidated profit and loss of International Paper and Power Company and subsidiary companies (excluding International Hydro-Electric System and its subsidiaries) for the second quarter and first six months of 1937, together with comparative figures for the corresponding periods of 1936, President Richard J. Cullen says:

"Through June 30, earnings for 1937 have continued to exceed budget estimates. Operations for the first six months resulted in a net profit of $5,032,693 before deduction for possible payment of tax on undistributed profits compared with a profit of $262,542 (after provision of $318,226 for tax on undistributed profits) during the first six months of 1936. This improvement, which would have been greater had it not been for the change in method of handling inventories referred to in the report for the first quarter of 1937, reflects an increase of approximately 11 per cent in physical volume of business, higher prices for many grades of pulp and paper, and operating economies resulting from expenditures made for plant improvements over the last two years.

"On July 15 the Securities and Exchange Commission, in accordance with its report on the company's plan for change in capitalization, held a second hearing at which evidence was received primarily upon the results of the shareholders' vote upon the plan and the accuracy of that vote in expressing the actual wishes of the shareholders. The Securities and Exchange Commission has now issued an order excepting the company from the applicable sections of the Public Utility Holding Company Act of 1935 in respect to the common stock issuable on conversion of the cumulative convertible 5 per cent preferred stock provided for in the plan and the common stock issuable on exercise of the common stock purchase warrants provided for in the plan.

"On August 3, your Board of Directors met and voted to take the necessary steps to bring the plan into effect. Application must be made to list the new shares of the New York Stock Exchange and for their registration under the Securities Exchange Act of 1934. This, together with other necessary steps, will require some time, but the directors expect that they can fix the date for the exchange of the new certificates for the old, not later than October 1, 1937.

"At or prior to that time, full instructions will be sent to all shareholders as to the method to be used in exchanging present stock certificates for the new certificates."

The statement of consolidated profit and loss is presented below.

J. E. Sirrine & Co. on Riegel Mill

Benjamin D. Riegel, chairman of the board of the Riegel Paper Corporation, 342 Madison Avenue, New York, announces that his company has engaged the services of J. E. Sirrine & Co., of Greenville, S. C., as engineers in the construction of the company's new pulp plant to be located in the vicinity of Wilmington, N. C.

STATEMENT OF CONSOLIDATED PROFIT AND LOSS

	Quarter Ended June 30, 1937	Quarter Ended June 30, 1936	Six Months Ended June 30, 1937	Six Months Ended June 30, 1936
Sales and Other Income:				
Gross sales, less returns, allowances and discounts	$33,251,466.77	$27,423,625.06	$63,034,616.36	$52,943,960.91
Other income—net	399,318.95	330,145.25	664,605.28	559,949.21
	$33,650,785.72	$27,753,770.31	$63,699,221.64	$53,503,910.12
Cost and Expenses:				
Cost of Sales:				
Pulpwood, labor, materials, etc.	$18,820,870.19	$16,243,288.33	$36,720,931.30	$32,066,208.10
Maintenance and repairs	1,959,889.42	1,620,484.57	3,643,604.08	3,339,151.28
Taxes (other than income taxes)	675,773.98	518,827.33	1,292,449.33	1,032,649.30
Outward freight and delivery expenses	3,791,307.58	3,705,089.50	7,317,811.65	7,251,413.72
Selling, general and administrative expenses	1,458,474.97	1,466,876.77	2,904,065.94	2,966,933.64
Provision for doubtful accounts	153,542.97	155,509.23	305,092.90	312,323.76
	26,859,859.11	23,710,075.73	52,183,955.20	46,968,679.80
	$6,790,926.61	$4,043,694.58	$11,515,266.44	$6,535,230.32
Deductions:				
Interest on funded debt	$1,009,288.41	$916,435.41	$2,037,502.22	$1,838,155.17
Interest on other debt	756.64	187,341.53	4,810.50	421,306.55
Amortization of debt discount and expense	105,220.92	87,432.08	206,332.80	173,180.10
Depreciation	1,071,574.08	1,284,795.86	2,094,763.19	2,458,820.30
Depletion	339,909.76	187,005.67	584,428.21	354,898.80
Provision for income taxes	959,883.83	222,614.66	1,500,911.70	353,779.66
Provision for Federal undistributed profits tax	.....	318,226.00	.....	318,226.00
Dividends accrued but not being currently paid on preferred stocks of subsidiaries	18,177.05*	174,626.55	53,824.61*	354,321.11
	3,504,810.69	3,378,477.76	6,482,573.23	6,272,687.69
Net Profit	$3,286,115.92	$665,216.82	$5,032,693.21	$262,542.63

* The 1937 figures contain no provision for dividends on the preference shares of International Power and Paper Company of Newfoundland, Limited. Under a recent agreement, such dividends are non-cumulative until 1939.

In the above consolidated financial statements foreign accounts are stated on the basis of $4.85 for the pound Sterling and at parity of exchange for Canadian and Newfoundland currencies without adjustment of differences. It is the practice of the companies to reflect in current operations any differences between these rates and the current quotations at the time funds are actually purchased or transferred.

Unpaid cumulative dividends on 7% and 6% cumulative preferred stocks of International Paper and Power Company for the period from April 15, 1931 to June 30, 1937 amount respectively to $39,844,164.50 ($43.46 per shares) and $147,323.75 ($37.25 per share) or a total of $39,991,488.25.

The above statements are subject to final adjustment at December 31st (end of fiscal year).

Paper Exhibit for Chicago Arouses Interest

Many Well Known Concerns Have Already Reserved Space for the Paper Show To Be Held In Connection With Meeting of N. P. T. A. — While Chicago Market Is Quiet Considerable More Activity Is Expected.

[FROM OUR REGULAR CORRESPONDENT]

CHICAGO, Ill., August 9, 1937—The office of the National Paper Trade Association reports that additional reservations are being received daily for space in their room exhibit of wrapping paper lines and allied products. This, as already announced, is to be held at the Stevens Hotel, Chicago, September 20-23 in connection with the regular fall convention of the association. It is expected that the wide interest in this show and the opportunities which it will provide for up-to-date familiarity with manufacturer's lines and new products will considerably increase the regularly large attendance at this convention.

Among the prominent manufacturers who have already announced that they will participate in the exhibit are the following: Orchard Paper Company, Crystal Tissue Company, Central Paper Company, Menorha, Detroit Sulphite Pulp and Paper Company, Central Paper Company, Muskegon; A P W Paper Company, Lily-Tulip Cup Company, Kalamazoo Vegetable Parchment Company, Hoberg Paper Mills, Hooven & Allison, Wolf Brothers, Bay West Paper Company, Nekoosa-Edwards Paper Company, White Washburne Company, Diana Manufacturing Company, Sealright Company, Inc., January & Wood, Brown Company, Sherman Paper Products Company, Racquette River Paper Company, Brower Paper Company, Midland Products, Inc., A. C. Hummel Company, Minerva Wax Paper Company, Brown-Bridge Mills, Dixie-Vortex Company, A. W. Mendenhall Company, Jay Dee Products Company, Kleen Products Company, Penley Bros. Company, Paper Plate & Tray, Inc.

Thursday, September 23, the last day of the convention, is especially designated as Salesmen's Day at the exhibit. Many wrapping paper merchants within a reasonable distance of Chicago have stated that they will bring a considerable representation of their sales force to Chicago to visit the exhibits on that day, thus giving them the benefit of the displays, sales hints and new information provided by the manufacturers. It is doubtful if so much valuable sales education could otherwise be obtained in so short a time and at so little cost.

More Activity Looked For After Labor Day

While the Chicago paper market is in the supposedly "doldrums" season there is plenty of activity to forecast the speedy movements looked for after Labor Day. Uniform strength in virtually every market is taken as an indication that price advances are certain to be spread over a wide field. Reports of tremendously increased costs of doing business also give credence to the general feeling that the paper industry is going to find markets forging upward in the very near future. Specifically, the local market was somewhat colorless during the initial week of August. Groundwoods, krafts and newsprint markets were generally strong with the impressive scarcity of the raw materials helping to strengthen the undertone. Fine papers started the month with a fair demand and with buyers reported more anxious to make commitments for fall business than at any time during the summer. Sulphites, all grades, were reported as little changed. Books and covers were firm with the latter grade finding fall business buyers helping to increase the average size of orders. The board market was holding its own preparatory to an expected upward turn in the early fall. Waste papers were more active though price changes were negative. The board making grades were in good demand with mixed papers and folded news sharing in the more favorable reports. Soft white shavings and krafts were reported spotty.

Midland Issues Price Changes

The Midland Company division of the Zellerbach Paper Company has recently issued changes in its catalog which lists price changes, all essential information on bonds, books, blanks, bristols, covers, envelopes, thin papers, press room supplies and other lines. Midland also announces a new sample room equipped with modern dust-proof files wherein a complete line of sample papers is maintained. In addition to a complete range of items carried in Chicago stock, there are filed samples of all regular mill items and an extensive range of papers available on special runs.

Earnings Figures Decline

Earnings and number of workers employed tapered off slightly in the Middle West during June according to figures for the Seventh Federal Reserve District for June 15, as compared to May 15. The paper and printing industry in Wisconsin, Michigan, Indiana, Illinois and Iowa showed 617 reporting firms for the week ending June 15, having a total of 79,488 wage earners with earnings of $2,347,000. The number of wage earners declined 0.7 per cent as compared to May 15 while the earnings showed an even more marked decline of 1.5 per cent.

New Publication Distributed

The Chicago printing and advertising world is taking kindly to a brand new pocket-size magazine "Paper Progress" which made its appearance this month to the Chicago trade. Obviously, the 50 page publication is to be sent to prospective paper buyers through the announced courtesy of many local firms. The magazine itself is excellently edited and contains a surprisingly large and useful amount of editorial matter pertaining to the making and use of paper. Included in the contents are "Cost Advances are Greater Than Price Rises"; "Your Paper Has Improved in Five Years", a fascinating article by C. H. Christiansen of the Millcraft Paper Company; "Waste Basket No Place for Paper Samples", by Henry Zimmerman, Johnston Paper Company and an interesting account of a trip through the Gilbert Paper Company mills at Menasha. The mast head of the publication fails to reveal the names of the editors or the place of publication.

TAPPI Program for Savannah Meeting

The following papers will be presented at the fall convention of the Technical Association of the Pulp and Paper Industry, to be held at Savannah, Ga., October 18-21, 1937:

Monday, October 18

Symposium on Wood Supply, C. W. Boyce, chairman.

1. Pulpwood Supply in the South, by I. F. Eldridge, Southern Experimental Station.
2. Relationship between Pine for Pulpwood, Saw Timber and Naval Stores, A. E. Wackerman, Southern Pine Association.
3. Cost of Wood at Mill, by W. L. Hall, Hot Springs, Ark., and Albert Ernest, Union Bag and Paper Company, Savannah, Ga.
4. Forestry Operations and Land Ownership, Karl Swenning, Mead Corp., Kingsport, Tenn.
5. Wood Supply of the World, by John Traquair, Mead Corp., Chillicothe, Ohio.

Luncheon Speaker—Guy Woolford, President, Georgia Forestry Association.

Tuesday, October 19

Symposium on Pulping Southern Pine, O. W. A. Rodowski, chairman.

1. Bleaching of Kraft Pulp, by John Campbell and L. O. Rolleston, International Paper Company, Glens Falls, N. Y.
2. The Herreshoff Furnace, by K. A. Forrest, Crossett Paper Company, Crossett, Ark.
3. Acid Pulping of Young Southern Pines, II. Sulphite Pulps for Viscose, Newsprint and other Papers, Pulp and Paper Laboratory of the Industrial Committee of Savannah.
4. Chemical Balance for a Continuous Recausticizing System, by O. W. A. Rudowski, Union Bag and Paper Company, and C. L. Knowles of The Dorr Company, New York, N. Y.
5. Grinding Southern Pine for Newsprint, Pulp and Paper Laboratory of the Industrial Committee of Savannah. (By Title.)
6. Modern Trends in Electrical Distributing in Pulp and Paper Mills, by W. M. Emmons (Westinghouse) (By Title.)

Wednesday, October 20

Symposium on Fibre Structure, Charles Carpenter, chairman.

1. A Further Report of the Changes Taking Place in the Structure of Fibers as a Result of the Operations of Pulping and Stock Preparation, Institute of Paper Chemistry, Appleton, Wis.
2. Chemical Composition of Wood, G. J. Ritter and W. O. Van Beckum, Forest Products Laboratory, Madison, Wis.
3. The Visible Structure of Natural Fibers, Thomas Kerr, Bureau of Plant Industry, Dept. of Agriculture, North Carolina State College.
4. Fastness of Paper to Light, by H. Ainsworth Harrison, Cooke & Nuttall Ltd., Horwich, Lancs., England.
5. Nature of the Resin Acids by Torsten Hasselstrom, G. & A. Laboratories, Savannah, Ga.
6. Southern Clays for Paper Making, by Poole Maynard, Atlanta, Ga. (By Title.)

Thursday, October 21

Post Convention Trip to Brunswick, Ga., plant of Hercules Powder Company.

The program will in general, feature the utilization of the Southern pines which is the basis of the woodpulp industry of the South. At present only the kraft and groundwood processes are being used but it is quite likely that by the end of 1938 there may be one or more mills using the sulphite process.

The three mornings of the convention will be given over to the discussion of technical developments. The afternoons will be used for visits to pulp and paper mills and to woods operations. A splendid program of luncheons, banquets, oyster roasts, golf and outings has been arranged.

On Thursday, October 21 the Hercules Powder Company will be hosts to those attending the meeting and will provide a special train to take members to Brunswick, Ga., where they may visit the extensive naval stores operations, have luncheon at the famous Cloister Hotel on Sea Island Beach, followed by golf and swimming.

Any one interested in attending this meeting will be welcome. Reservations should be made direct with the Savannah or De Soto Hotels. Although the De Soto Hotel has been completely sold out to those who have made reservations, excellent accommodations are still available at the nearby Savannah Hotel.

An excellent program has been prepared for the ladies who will attend. These feature bridge parties at the golf club, when the old Confederate fortification may be seen; visits to famous plantations; fashion shows; visits to old Southern homes; dinner-dances; a crinoline party, etc.

Savannah may be reached by the Seaboard Airline, Atlantic Coast Line, Louisville and Nashville and Central of Georgia railways, and by pleasant ocean trip on the Savannah or Merchants and Miners Line. The Savannah Line leaves New York and Baltimore and the Clyde-Mallory Line leaves New York, stopping at Charleston, S. C., and Jacksonville, Fla., from which Savannah may be reached by train or bus. People visiting Jacksonville may enjoy an interesting visit to St. Augustine, America's oldest city. The sightseeing trip in Charleston is distinctly worthwhile from the standpoint of beauty and historical interest.

Salesmen To Hold Golf Outing

The Salesmen's Association of the Paper Industry will hold its golf outing this Tuesday, August 17, at the Tamarack Country Club, Portchester, N. Y. The activities include a tournament that starts at one o'clock, the winners of which will receive prizes consisting of a fine selection from Ovingtons.

For those who do not play golf, the committee has arranged a Quoits Tournament. In addition, there will be swimming and, at twilight, a soft ball game will be played, with plenty of beer for those who reach third base.

Six dollars covers all-day golf and dinner. Reservations for you and your guests should be made promptly, by communicating with Howard R. Miller, chairman, the Howard Paper Company, 350 Fifth Avenue, New York City.

Financial News of Pulp and Paper Industry

Flintkote and Subsidiaries Report for Thirteen Four-Week Periods Ended July 17 Net Income of $1,358,868 — Scott Paper Co. Net Profit $613,826 for Six Months Ended July 4 — Pacific Mills Earn $576,658.

New York Stock Exchange

High, Low and Last for the Week Ending August 11, 1937

	High	Low	Last
Armstrong Cork Co.	63	58⅛	62¾
Celotex Corp.	42½	41	41
Celotex Corp., pf.	77¾	76½	76½
Certain-Teed Products Corp.	14⅛	13½	13⅜
Certain-Teed Products Corp., pf.	55½	51¼	51¼
Champion Paper & Fibre Co.	59	57¼	57½
Champion Paper & Fibre Co., pf.	108¾	108¼	108¼
Congoleum-Nairn Co.	39	38	38⅜
Container Corp. of Amer.	30½	29¼	29¼
Continental-Diamond Fibre Co.	19½	18⅜	18⅜
Crown Zellerbach Co.	21¾	17⅝	21⅜
Crown Zellerbach Co. cum. pf.	99	95	99
Flintkote Co.	33⅜	30	30
Robert Gair Co.	14	12⅜	12⅜
International Paper & Power (a)	19⅞	17¼	18⅞
International Paper & Power (b)	14⅞	12⅛	14
International Paper & Power (c)	7⅞	6⅜	7⅛
International Paper & Power pf.	106¾	96	105⅛
Johns-Manville Corp.	136¼	132¾	135
Kimberly-Clark Corp.	41	41	41
MacAndrews & Forbes	32½	32½	32
MacAndrews & Forbes, pf.	129	127½	127½
Masonite Corp.	54	53	53
Mead Corp.	28½	27	28
Mead Corp., pf.	95¼	95	94¼
Paraffine Companies, Inc.	68	68	68
Paraffine Companies, Inc., pf.	100	100	100
Scott Paper Co.	41¾	39¾	41½
Sutherland Paper Co.	34	32¾	32¾
Union Bag & Paper Corp.	81	74	80
United Paperboard Co.	11⅜	10¾	11
U. S. Gypsum Co.	118	115½	117¼
U. S. Gypsum Co., pf.	163	162	163

New York Curb Exchange

High, Low and Last for the Week Ending August 11, 1937

	High	Low	Last
American Box Board Co.	21½	20⅜	20½
Brown Co., pf.	83	81	82
Great Northern Paper Co.	40½	39	39¾
St. Lawrence Paper Co.	12⅞	12¼	13¼
St. Regis Paper Co.	9⅜	8⅜	8⅞
St. Regis Paper Co., pf.	110	110	110
Taggart Corp.	11	10⅝	10⅞

Flintkote Increases Profits

The Flintkote Company and its subsidiaries reported last week for the thirteen four-week periods ended on July 17 a net income of $1,358,868 after Federal, State and foreign taxes. The year's profit was equal to $2.03 each on 668,746 shares of stock outstanding and compared with one of $1,156,245, or $1.73 each on 668,046 shares of stock then outstanding, in the preceding fifty-two weeks.

For the first seven four-week periods of its fiscal year, the company reported a net income, after Federal, State and foreign taxes, of $659,233, equal to 98 cents a share on the outstanding stock, against a net income of $471,399, or 71 cents a share, in the first seven periods of last year.

For the four periods ended on July 17, net income after Federal, State and foreign taxes was $465,648, or 70 cents a share, against $436,101, or 65 cents a share, in the same period of 1936.

For the year to July 17, net sales were $15,122,687, against $12,509,769 in the preceding fifty-two weeks. For the seven four-week periods ended on July 17, net sales were $8,213,211, against $6,766,782 a year before, and for the four periods, net sales were $4,900,143, against $4,206,063.

I. J. Harvey Jr., president of the company, said in connection with the financial statement that wage increases given at all the company's plants early in 1937 would amount to approximately $200,000 annually, and that increased taxes for the first seven periods of the year were approximately $35,000 more than those for the corresponding period in 1936.

Scott Paper Co. Earns $1.07 Per Share

The Scott Paper Company in report for six months ended July 4, shows net profit of $613,826 after charges, equal to $1.07 a share of common stock outstanding. This compares with net profit in six months ended June 28, 1936, of $471,739, equal after dividend requirements on 7 per cent preferred stock then outstanding, to $1.49 a share on common.

For quarter ended July 4, indicated net profit was $356,549, equal to 62 cents a share on common, comparing with $257,276, or 45 cents a share in preceding quarter and $237,139, or 76 cents a share, in June quarter of previous year.

For twelve months ended July 4, net profit was $1,140,097, after charges, equal to $2 a common share. No comparison with preceding twelve months is available.

Current assets as of July 4, including $1,969,838 cash, amounted to $4,211,260 and current liabilities were $1,076,863. This compares with cash of $746,156, current assets of $3,367,447 and current liabilities of 782,108 on June 28, 1936.

I. P. To Change Capitalization

The board of directors of the International Paper and Power Company met last week and voted to take the necessary steps to bring into effect the company's plan for change in capitalization. Application must be made to list the new shares on the New York Stock Exchange and for their registration under the Securities and Exchange Act of 1934. This, together with other necessary steps, will require some time, but the directors expect that they can fix the date for the exchange of the new securities for the old not later than October 1, 1937.

The action taken by the directors followed receipt by the company of an order from the Securities and Exchange Commission exempting the Company from the applicable sections of the Public Utility Holding Company Act of 1935 in respect to the Common stock issuable on conversion of the cumulative convertible 5 per cent preferred stock provided for in the plan and the common stock issuable on exercise of the common stock purchase warrants provided for in the plan.

Nashua Gummed Earns $319,760

Nashua Gummed & Coated Paper Co., Nashua, N. H., reports net operating profit of $319,760 available for taxes and dividends in the six months ended June 30, 1937. This compares with $168,949 in the same period last year before provision of $60,018 for flood loss incurred during that period.

After reserve for taxes other than those on excess

profits and undistributed earnings and after deducting dividend requirements for the half-year on the preferred stock, a balance of $254,660 is shown for the first six months of this year, equal to $5.53 a share on the 46,058 shares of outstanding common stock. For the same period of 1936, such earnings amounted to $134,930 before flood loss, equivalent to $3.41 a share on the 39,558 shares then outstanding. After deducting flood loss, the figures for the 1936 period was reduced to $74,911, or $1.89 a share.

The June 30, 1937, balance sheet lists current assets of $3,008,564, including $611,569 in cash. Current liabilities, including reserves for taxes, amounted to $707,086.

Pacific Mills Earn $576,658

VANCOUVER, B. C., August 7, 1937—An increase of $281,946 was recorded in the net profit of Pacific Mills Limited for its fiscal year ended April 30, 1937, over its 1936 fiscal year, according to the financial statement recently issued. The statement showed a net profit of $576,658 as compared with $294,712. Both figures are those resulting after depreciation, depletion, bond interest and income taxes.

Earned surplus as at April 30, 1937, amounted to $6,726,400, after $119,934 in dividends on preference shares and $150,000 on common shares had been deducted. Pacific Mills Limited is a subsidiary of the Crown Zellerbach Corporation.

Seek Additional Dennison Assents

FRAMINGHAM, Mass., August 9, 1937—The Dennison Manufacturing Company's special meeting called for action on the reorganization plan, has been adjourned to Sept. 23, H. S. Dennison, president explains, to enable additional stockholders to send in their papers.

All classes of stock entitled to vote have sent in their assents, so that the total is well over the majority mark, according to Mr. Dennison, who says "a high percentage of each class of stock is necessary before the plan can be consummated, effectively and economically."

Eddy Paper Reports $3 Share in 6 Months

The Eddy Paper Corporation, manufacturers of boxboard, fiber and corrugated shipping containers, shows net profit of $535,709 for the six months ended June 30, 1937, after depreciation and federal income taxes, but before federal surtax on undistributed profits, equivalent to $3 a share on 178,000 shares of capital stock outstanding. This compares with $171,730 or 96 cents during the first half of 1936. Net profit for the full year, 1936, after deducting depreciation, income and profit taxes, amounted to $428,256.84, or $2.40 per share.

Glens Falls Machine Works Continues

Paul D. Broomell, manager of Glens Falls Machine Works, Incorporated, writes:—

"We note a news item in your publication, to the effect that we have dissolved. While this is true, this action was taken for the purpose of reorganization and incorporation only, and we are still doing business under the name of Glens Falls Machine Works, Incorporated."

TAPPI Notes

The Index to the Technical Section of the PAPER TRADE JOURNAL (January to June, 1937) is now available. Send requests to the Technical Association of the Pulp and Paper Industry, 122 E. 42nd Street, New York.

J. E. Spalding, formerly of the Institute of Paper Chemistry, is now with the Oxford Paper Company, Rumford, Me.

R. K. Ulm, formerly of the Institute of Paper Chemistry, is now a development engineer with the Container Corporation of America, Manayunk, Pa.

B. J. Russell, who was with the Southern Kraft Corporation at Panama City, Fla., is now with the Kraft Corporation at Fernandina, Fla.

P. S. Billington, who has been at the Forest Products Laboratory, Madison, Wis., for several years, is now with the Weyerhaeuser Timber Company at Longview, Wash.

F. W. O'Neal has taken the position as instructor at the New York State College of Forestry, having been with the Hooker Electrochemical Company at Niagara Falls, N. Y., for about two years.

F. C. Clark, formerly vice-president of Skinner & Sherman Inc., Boston, is now mill manager of the paper mill of the Pond's Extract Company at Seymour, Conn.

F. N. Beveridge, formerly of J. C. Wilson, Ltd., Lachute Mills, Quebec, is now superintendent of the Kraft Corporation, at Fernandina, Fla.

R. H. Laftman, formerly manager of Billingsfors A/B, Sweden, is now manager of the National Container Corporation at Jacksonville, Fla.

Frederick Wierk of Johnson & Wierk, Inc., New York, N. Y., is now located at Jacksonville, Fla., and is the engineer in charge of construction of the National Container Company.

Big Newsprint Mill for Australia

VANCOUVER, B. C., August 7, 1937—According to Sir Keith Murdoch, Australian newspaper publisher, a £3,500,000 news print industry will shortly be established in Tasmania to meet the requirements of Australia.

The Commonwealth is one of British Columbia's important newsprint markets, and if a mill were established to look after the country's needs it would mean a great cut in B. C.'s exports. However, British Columbia newsprint manufacturers are not disturbed by the announcement, stating that the Commonwealth's supply is insufficient to meet the country's total demands. Until comparatively recently, indeed, it was believed that the Australian wood was unsuitable for such manufacture, but a species of eucalyptus has now been found on Tasmania which meets requirements for pulpwood manufacture. The B. C. men refuse to believe that the projected development will interfere to any major extent with their exports, however.

John Dudley Calls on Jobbers

HOLYOKE, Mass., August 9, 1937—John Dudley, for many years in the manufacturing department of the Advertisers Paper Mills, is now calling on the jobbers, supplementing the work of Frank E. Taylor, vice-president and general manager. Mr. Dudley recently made his first trip to Boston.

Obituary

Herbert J. Laughton

Herbert J. Laughton, for the past eleven years associate editor of the PAPER TRADE JOURNAL, died at the Staten Island Hospital on Thursday of last week after an illness of several months with an uncommon blood disea

Mr. Laughton was born in Liverpool, England, October 31, 1876. After completing his education at the Liverpool Institute he became a contributor to the *Liverpool Mercury* and also acted as the Liverpool correspondent for several London daily papers. In 1902 he came to the United States and became

HERBERT J. LAUGHTON

connected with the publishing business. Among other publications he was engaged on the editorial staff of *Shipping* and also worked for a time on the *New York Sun*. When the world war broke out in 1914 he returned to England and served on the western front throughout the war in the 2nd Battalion of the Royal Scots Guards. After the war Mr. Laughton worked for the Liverpool Branch of the War Pensions Committee and also was a regular contributor to the *Liverpool Daily Post* and the *Mercury*. At this time be became well known to the world of sports, especially in the north of England and Scotland. He captained the Liverpool Strollers' Cricket Club and the Liverpool Caledonian Association Football Club at the start of their existence, and after the war was captain of the Wallasey Hockey Club for several years. In early days when in Devonshire he played for the Ilfracombe Cricket Club and Dawlish Hockey Club, taking part in the County trials, and only his departure for America is considered to have prevented his winning his cap. Mr. Laughton was also a splendid tennis player.

The year 1920 found him back in New York on his old post on *Shipping* and a little later he became the associate editor of *Tobacco*. He retained this position until 1926 when he joined the editorial staff of the PAPER TRADE JOURNAL as associate editor.

Always keenly interested in tropical and subtropical countries, their people and crops, Mr. Laughton felt that America needed a trade journal devoted to the great cacao or cocoa industry and so he started *Cocoa and Chocolate* in November of 1935, hoping with the promised help of many supporters that such a paper would enable manufacturers and brokers in the United States to learn much about the article they are all so keenly interested in, while the planters at the same time might be helped to obtain better prices for their crops. This journal, however, was recently temporarily suspended.

Mr. Laughton is survived by his widow, Elizabeth Louise, and two sons, John W. and Frank J., and a daughter, Ethel C.

The funeral services were held from Mr. Laughton's late home at 983 Darlington avenue, Princes Bay, Staten Island, N. Y. at 3 o'clock, Sunday afternoon, August 8th, the Episcopalian funeral service being read. Burial was in Woodrow Cemetery.

Mr. Laughton's attractive disposition endeared him to his colleagues and gained him the respect of a large circle of acquaintances with whom he came in contact through his work on the PAPER TRADE JOURNAL.

Anson Strong Brooks

Anson Strong Brooks, aged 84, pioneer Minnesota resident and one of the outstanding lumbermen of America, died August 3, 1937, at his home—2535 Park avenue, Minneapolis, Minnesota. He would have been 85 years old on September 6.

He was the son of Dr. Sheldon and Jeanette (Ranney) Brooks, and was born in Redfield, Oswego County, N. Y., Sepetmber 6, 1852. The elder Brooks was a member of the second Minnesota Legislature and was long prominent in early day affairs.

In 1856 Mr. Brooks' parents removed to Minnesota and settled on a farm in Beaver, Winona County. The family moved to Minneiska in 1862, where the father engaged in the grain warehousing business, all grain being barged down the Mississippi. In 1867, the Northwestern Telegraph Company installed its office in the grain warehouse and Mr. Brooks, at the age of fifteen, became a telegraph operator for that company. Later, when the Chicago, Milwaukee & St. Paul Railroad was built, up the Mississippi, he became their operator to Minneiska. In the meantime he was learning the grain business.

In 1873, when he became of age, the partnership of Brooks Brothers was formed with his brothers, Lester Ranney and Dwight Frederick Brooks, taking over the grain business. In 1878 they began to deal in lumber. In 1880 Mr. Brooks drove out from Northwestern Minnesota by team through the Red River Valley, locating sites at points along the unfinished Minneapolis & Manitoba Railway, for the establishment of elevators and lumber yards. In 1881 he moved to Grand Forks, Dakota Territory, to take charge of the building and operation of business in that territory. After the business was well established, Mr. Brooks, with his family, moved to Merriam Park, a suburb between Minneapolis and St. Paul, in 1891.

With his brothers he remained in the grain business until 1897, having in the meantime formed the Brooks Elevator Company and Brooks-Griffiths Company; the latter doing a commission business with offices in the Chamber of Commerce at Minneapolis. The opportunities afforded by the lumber industry attracted their attention more and more and in 1893 they started the manufacture of lumber, in connection with M. J. Scanlon and H. E. Gipson, having formed the Scanlon-Gipson Lumber Company. In 1901 Brooks-Scanlon Lumber Company was organized

and later Brooks-Scanlon Company, Brooks-Scanlon Corporation and other lumber manufacturing and timber holding companies, and railway companies operating in connection with their lumber enterprises. In 1909 the Powell River Paper Company, Limited, was formed, and they engaged in the manufacture of newsprint.

He was a Republican and a member of the Minneapolis, Minikahda, Lafayette and Automobile clubs. He had been a Mason since 1873.

Anson Strong Brooks married, at McGregor, Iowa, July 24, 1876, Georgie Lillian Andros, born in Garnaville, Iowa, September 28, 1858.

Surviving are one son, Paul Andros Brooks, of

ANSON STRONG BROOK

Minneapolis, Minnesota, five grandchildren, Mrs. John M. Hollern, Anson, Barbara, Sheldon and Stanley Brooks, and one great-grandchild, Sheila Brooks Hollern; four nephews, Edward Brooks of St. Paul, Minnesota, Harry K. Brooks of Bend, Oregon, Sheldon D. Brooks of Vancouver, B. C. and Philip R. Brooks of Portland, Oregon.

At the time of his death Mr. Brooks was chairman of the board of Brooks-Scanlon Lumber Company Inc. of Bend, Oregon; chairman of the board of Powell River Company Ltd. of Powell River, British Columbia; secretary-tresaurer of Brooks-Scanlon Corporation of Foley, Fla.; president of Brooks Brothers, Inc., St. Paul, Minn.; treasurer of the Live Oak, Perry & Gulf Railroad Company of Foley, Fla.; first vice-president of the Bahamas-Cuban Company Limited, of Camaguey, Cuba, and a director of the First National Bank and Trust Company of Minneapolis, Minnesota.

Functions of the Traffic Manager

Not all companies include in their organization setup a formally designated traffic executive, but most companies are faced to some extent with the need for traffic management. The Policyholders Service Bureau of the Metropolitan Life Insurance Company has recently issued a report entitled "Functions of the Traffic Manager", which is based on data obtained from the traffic executives of 24 companies, representing such industries as food products, electrical goods, metal products, shoes, textiles, chemicals, boxes, paper, cameras, oil, steel and copper, and the distribution trades. It is designed to present the nature and scope of this position in those organizations.

A traffic manager, the report says, is charged with the responsibility of obtaining efficient, economical, and adequate transportation services at reasonable rates. Aside from these general functions, however, there are wid differences in the duties of the traffic managrs in individual companies. Some departments are concerned largely with obtaining and using low-cost transportation services that will provide the best possible service for goods after they leave the shipping department or before they reach the receiving dpartment, seeing that goods are safely dispatched, checking transportation charges, and developing lower costs through improved methods of distribution.

In some companies the traffic department's functions are expanded to include supervision of the shipping department and in some cases the receiving department. In still other cases the department is charged with the responsibility for company-owned transportation facilities. In most companies the traffic manager has certain administrative duties and certain cooperative relationships with other departmental executives such as sales, purchasing, production, etc.

Case-history outlines of the functions performed in the traffic departments of seven companies are presented in the report. These include manufacturers of both consumer and indusrial goods, and a limited-price variety chain. One section of the Bureau's report discusses the internal organization of the traffic departments of several companies; another is concerned with the measurement of the traffic department's performance. Specific accomplishments of individual traffic departments are cited. In the appendix to the report there is a detailed listing, in the nature of a composite picture, of the activities of the 24 reporting traffic managers.

A final section of the report deals with considerations affecting the installation of a traffic department. The size of a company's transportation bill is a major factor. Several contributors suggested a survey to show potential savings which efficient traffic management will bring. Convincing proof may consist of savings achieved through traffic management by companies in the same or similar industries. Copies of "Functions of the Traffic Manager" may be obtained from the Policyholders Service Bureau, Metropolitan Life Insurance Company, One Madison Avenue, New York City, New York.

Miniature Packing Catalogue

A new "Miniature" Packing Catalogue, featuring the eleven most commonly used U. S. Packings, has been announced by the Mechanical Goods Division of United States Rubber Products, Inc. The "Preferred Eleven" illustrated in this booklet were chosen because they meet a large percentage of normal packing requirements.

This booklet was compiled as a substitute for the larger and more comprehensive Packing Catalogue issued by "U.S." earlier this year. It should prove particularly valuable as a handy reference for engineers, plant operators, and executives.

Johns-Manville Announces Promotions

Seven promotions, including the election of three new vice presidents of the Johns-Manville Products Corporation, were announced on August first by Lewis H. Brown, president of Johns-Manville Corporation.

The new vice presidents of the J-M Products Corporation, a subsidiary controlling most of the Company's wide-spread manufacturing and mining activities, are A. R. Fisher, formerly manager of the Company's largest factory at Manville, N. J.; J. P. Kottcamp, who has been the manager of the key Mid-Western factory at Waukegan, Ill.; and Alexander Cromwell, currently manager of the Pacific Coast manufacturing operations.

These men have general supervision over newly-established manufacturing districts, each of which includes five factories. Mr. Fisher has been assigned the Eastern District, which includes plants at Asbestos, Province of Quebec; Nashua, N. H.; Oswego, N. Y.; Manville, N. J., and an insulating board plant, not yet constructed.

The Central Division, consisting of plants at Waukegan, Ill.; Alexandria, Ind.; Richmond, Ind.; Newell, West Virginia; and Marrero, La. is under Mr. Kottcamp, whose headquarters remain at Waukegan.

Mr. Cromwell is in charge of manufacturing activities on the Pacific Coast at Lompoc, Pittsburg, Redwood City, Los Angeles and Watson, California.

J. E. Begert, formerly head of the Cost Reduction Department at J-M Headquarters in New York City, has succeeded Mr. Fisher as manager of the Manville plant.

At the Waukegan factory K. W. Huffine, formerly manager of the Alexandria plant, has been named to succeed Mr. Kottcamp as manager.

H. J. O'Brien, formerly superintendent of the Rock Wool Department at the Manville factory, has become manager of the Alexandria plant.

W. Kelty, who was assistant to Mr. Begert in the Cost Reduction Department, succeeds him as manager of that department.

Coincident with the establishment of these three new manufacturing districts, Johns-Manville has consolidated its mining operations at Asbestos, Province of Quebec, and Chrysotile, Arizona, to form the Asbestos Division, which is under the charge of C. H. Shoemaker, vice president of Canadian Johns-Manville Company, Ltd.

Leaves Stevens & Thompson Paper Co.

[FROM OUR REGULAR CORRESPONDENT]

HOOSICK FALLS, N. Y., August 7, 1937 — Announcement is made here of the resignation of Lieut. Carl W. Stevens from the executive staff of the Stevens & Thompson Paper Company after a period of service extending over twenty years. Lieut. Stevens, a grandson of the late Samuel Stevens, founder of the company, is the last of three generations of the Stevens family who was actively connected with the concern. He started in the mill as a mill hand and has been in the accounting department, on the board of directors and for several years has been a member of the sales force of the company. It was learned that he has several propositions in view although as yet he has made no definite plans. He plans to spend the next several weeks vacationing with his family.

Leo Meyer Starts New Firm

[FROM OUR REGULAR CORRESPONDENT]

DAYTON, Ohio, August 9, 1937 — Meyers Sales Company has been established here to deal only with the wholesale trade, by Leo Meyer, who had been connected with a Fort Wayne, Ind., paper firm, as the Dayton representative, for a number of years.

Mr. Meyer, who is not unknown to the Dayton and Miami Valley trade because of his past connection with the Banner Bazaar, when that firm occupied extensive quarters at Fifth and Jefferson streets, has established warerooms on Victoria Avenue, Dayton, and has contracted with a delivery firm for regular daily deliveries to patrons. He has added glass-ware for bars and refreshment concerns and a number of other items. Alphabetically viewed, it would appear that the Meyers Sales Company, from its list of merchandise articles, could supply almost every conceivable business with useful articles from aspirin tablets to window rubbers.

However, the most-sought articles handled by the firm are paper plates, paper bags, paper stock checks, safety matches, advertising book matches, salesbook paper, twines, soda straws and paper napkins. In fact, almost any line of paper can be ordered.

Mr. Meyer started out as his own principal salesman but his business has increased to such an extent, in a very short time, that assistance has been obtained.

TAPPI Pacific Section Plans

The Pacific Section of the Technical Association of the Pulp and Paper Industry has outlined an interesting series of meetings for the next season. They are scheduled as follows:

October 5, 1937 at Everett, Wash.; November 5, 1937 at Port Angeles, Wash.; January 11, 1937 at Portland, Ore.; February 8, 1938 at Camas, Wash.: March 10, 1938 at Vancouver, B. C.; April 5, 1938 at Seattle, Wash.; May 3, 1938 at Tacoma, Wash. June (date to be announced). Annual Meeting.

Any one wishing to present a paper at one of these meetings should communicate with N. W. Coster, vice chairman, Soundview Pulp Company, Everett, Wash.

The other officers of this section are: Chairman, G. H. McGregor, Pulp Division, Weyerhaeuser Timber Company, Longview, Wash.; Secretary-Treasurer, J. B. V. Cox, Paper Makers Chemical Division, Hercules Powder Company, Portland, Ore.; Executive Committee, W. R. Barber, Crown Willamette Paper Company, Camas, Wash.; and Carl Fahlstrom, Longview Fibre Company, Longview, Wash.

To Be Assistant Superintendent

[FROM OUR REGULAR CORRESPONDENT]

DEFERIET, N. Y. August 7, 1937—Lyman Beaman, of Menah, Wis., has been appointed assistant superintendent of the local branch of the St. Regis Paper Company, according to announcement from an official of the concern. The appointment was made to fill a new position and E. L. McCormick will continue as superintendent here. Mr. Beaman has been connected with the Consolidated Paper Company, Menah, for several years and is well qualified for his new duties. His new work will consist of the supervision of groundwood papers.

CONSTRUCTION NEWS

A Summary of Vital Facts Regarding Construction, Finances and Operation of Pulp and Paper Mills

Scott Paper Co. to Add Machine

[FROM OUR REGULAR CORRESPONDENT]

PHILADELPHIA, Pa., August 9, 1937—Scott Paper Company announces that during the next six months $1,250,000 will be spent to increase the capacity of its plant by the addition of a new paper machine and supporting equipment. It is not expected that these expenditures will involve any outside financing.

"The further gain in business in the first half of 1937," the announcement states, "has taxed our paper-making equipment to the utmost. The paper mill operated at full capacity in the first six months of the year. Production for the period, however, fell 7 per cent short of orders booked. Continued increase in the popular demand for Scott products has made it necessary to again enlarge the capacity of our plant. An expansion program of a new paper machine, finishing equipment, enlarged water filtration plant and necessary building additions, has been undertaken."

Scott Paper Company already operates six 175-inch Beloit Fourdriniers, with a total daily capacity of about 200 tons of paper. The sixth unit was placed in operation in April, 1935, and since then several hundred thousand dollars has been expended in remodeling the other five machines to conform to latest operating practice.

With the acquisition of this new machine, Scott Paper Company will have seven of the most modern high speed tissue machines, all of standard width, comprising the largest battery of these types in any paper mill in the world.

P. H. Glatfelter to Improve Pulp Mill

The P. H. Glatfelter Company, Spring Grove, Pa., manufacturer of high grade book and bond papers, has contracted with George W. Dodge and Roderick O'Donoghue, Suite 1601, Graybar Building, New York City, to make plans for enlarging and re-equipping with modern machinery its soda pulp mill.

The plans call for a productive capacity of 75 tons per day of bleached soda fibers.

Glatfelter was one of the first in the country to use pine wood in the manufacture of soda pulp. It has recently been carrying on successful experiments in producing fast growing poplar and other trees indigenous to Southern Pennsylvania where the mill is located. This source of pulpwood will supplement the wood obtained by the Glatfelter Pulpwood Company which controls its own pulpwood operations in Southern Maryland, Virginia and Pennsylvania.

Glatfelter has enlisted the enthusiastic cooperation of the local farmers in cultivating and replanting usable woods assuring a constant supply of pulp.

The enlargements of the pulp mill is the start of widespread improvements and additions that are planned by the Glatfelter Company.

P. H. Glatfelter Lets Contracts

The P. H. Glatfelter Company, Spring Grove, Pa., which have plans under way for enlarging and re-equipping its soda pulp mill has awarded a contract for five digesters to the Petroleum Iron Works Company, Inc., Sharon, Pa. When the construction work has been completed, the mill will have a capacity of 75 tons per day of bleached soda fibers.

The plans call for a modern circulating system and indirect heaters which will be furnished by the Foster Wheeler Corporation.

Glatfelter is well known as being one of the first to cook pine wood by the soda process since 1881.

Nashau Gummed Erects New Building

[FROM OUR REGULAR CORRESPONDENT]

NASHUA, N. H., August 9, 1937—The Nashua Gummed and Coated Paper Company is erecting a new building 150x200 feet, five stories high, for storage purposes. The company is also to build a two-story addition for a new office.

General Construction News

Detroit, Mich.—The Chope-Stevens Paper Company, 1915 West Fort street, paper products, has approved plans for new two-story building, brick and reinforced-concrete, on Chene street, to be used for storage and distribution. General erection contract has been let to the Adler Contracting Company, 17041 Hamilton avenue, Detroit, and superstructure will be placed under way at once. Cost about $65,000, including equipment.

Menasha, Wis.—The George A. Whiting Paper Company, manufacturer of writing papers and other paper stocks, has plans for new boiler house at mill on River street, to be one-story, 25x50 feet. Bids have been asked on erection contract and work will be placed under way soon. Cost over $45,000, with boiler units and other equipment. Orbison & Orbison, 215 East Washington street, Appleton, Wis., are consulting engineers.

Mobile, Ala.—The National Gypsum Company, 190 Delaware avenue, Buffalo, N. Y., manufacturer of wall board and allied products, is concluding

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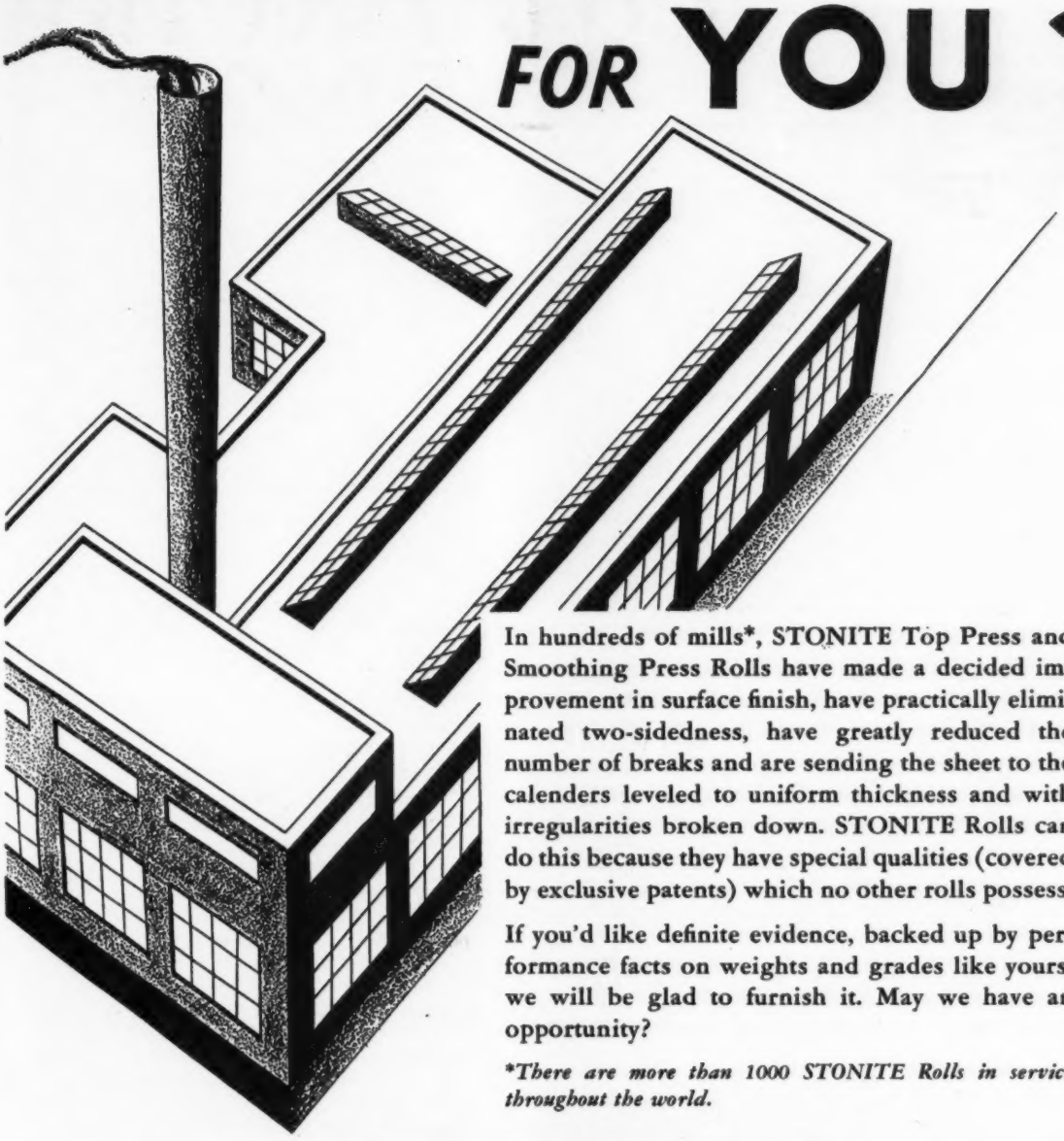

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negotiations for purchase of tract of land at Mobile, as site for new plant for production of insulating fiber board and kindred specialties. It will comprise a group of one and multi-story units, with power house, machine shop and other mechanical divisions, estimated to cost close to $2,000,000, with machinery. Facilities will be provided for employment of about 500 persons. It is proposed to begin erection early in the fall. M. H. Baker is president; G. H. Tarbell is vice-president and production manager.

Ilchester, Md.—The Bartgis Brothers Company, manufacturer of box board products, has awarded contract for structural steel framing to Bethlehem Fabricators, Inc., for new two-story addition to mill, recently noted in these columns, and work on erection will be placed under way at once. New unit will be used for storage and distribution, with portion given over to printing division. It is estimated to cost over $30,000, including equipment. General erection contract will be carried out by Julius A. Kinlein, American Building, Baltimore, Md. Frederick L. Smith, 21 East Fortieth street, New York, N. Y., is architect.

Philmont, N. Y.—The Mohawk Fibre Company, Inc., recently organized, is said to be arranging early operation of a mill in this vicinity for the manufacture of fiber board products and kindred specialties. New company is represented by Theodore H. Kline, Kresge Building, Hudson, N. Y.

Lockport, N. Y.—The Flintkote Company, Mill street, manufacturer of roofing papers, floor linings and kindred products, has plans for expansion and improvements in local mill, including erection of new one-story addition on Frost street. The roofing paper division will be increased in capacity, with installation of considerable additional machinery and new equipment will be installed in automotive felt division. Work is scheduled for completion early in October and is estimated to cost close to $75,000, with equipment. Company has plans maturing for production of a new sound-deadening board specialty for use in automobiles, and will use part of the expansion facilities noted for this purpose. Eugene B. Highhouse is superintendent. Main office of company is at 50 West Fiftieth street, New York, N. Y.

Southport, N. C.—The Southern Kraft Corporation, 220 East 42nd street, New York, N. Y., has begun construction of a new loading dock at Southport, to be used for pulpwood shipments from Brunswick County and neighboring counties in North Carolina, to new mill now in course of construction at Georgetown, S. C. The dock will be about 16 feet wide and 72 feet long, with mechanical-handling facilities. Company has taken over extensive timber properties in district noted for pulp wood development.

Chester, Pa.—The Scott Paper Company, Market street, manufacturer of tissue paper stocks, has awarded contract to David M. Hunt, 1700 Sansome street, Philadelphia, Pa., for foundations for new addition to mill, previously referred to in these columns, to be known as Building No. 13, and work will be placed under way at once. Bids have been asked on general erection and contract will be placed soon. New unit will be equipped for large increase in present capacity and is estimated to cost in excess of $1,000,000, including machinery. The Stone & Webster Engineering Corporation, 49 Federal street, Boston, Mass., is consulting engineer.

Adams, Mass.—The L. L. Brown Paper Company, Commercial street, manufacturer of writing papers, processed papers and other stocks, has awarded contract to the Casper Ranger Construction Company, Holyoke, Mass., for extensive alterations and improvements in mill, and work is being placed under way. Wood floor beams will be replaced with steel units and contract for this part of work has been let to the Haarmann Steel Company, Williamsett, Mass. Entire project is estimated to cost close to $25,000.

Brunswick, Ga.—The Union Bag and Timber Company, a subsidiary of Union Bag & Paper Company, Woolworth Building, New York, N. Y., has purchased a tract of over 13,000 acres of timberland in Glynn County, Ga., and will use this for pulpwood supply for new mill at Hermitage Plantation, Savannah, Ga., now in operation and where further expansion is under way. Timber property will be developed in near future, with establishment of saw mills and other facilities for timbering operations.

Hartsville, S. C.—The Sonoco Products Company, manufacturer of paper board stocks, board liners, etc., has completed a new mill addition, on which work has been in progress for a number of months past, previously referred to in these columns, and unit will be placed in service at once. It is two-story, 125 x 400 feet, adjoining present mill; it will double the floor space at the plant and permit straight-line production. Company also has erected a one-story building, 60 x 325 feet, to be used primarily for storage, distribution and shipping service. Expansion represents an investment of close to $500,000, including equipment. The Fiske-Carter Construction Company, Greenville, S. C., was general contractor for the work.

Pine Falls, Man.—The Manitoba Paper Company, Ltd., Winnipeg, Man., a subsidiary of the Abitibi Power and Paper Company, Ltd., Toronto, Ont., has plans maturing for expansion and improvements in sulphite pulp and newsprint mill at Pine Falls, to include erection of new units and installation of equipment to increase capacity to about 300 tons per day. Entire project is estimated to cost about $800,000, and will be placed under way soon. The development is part of the reorganization program of the parent company, now in progress.

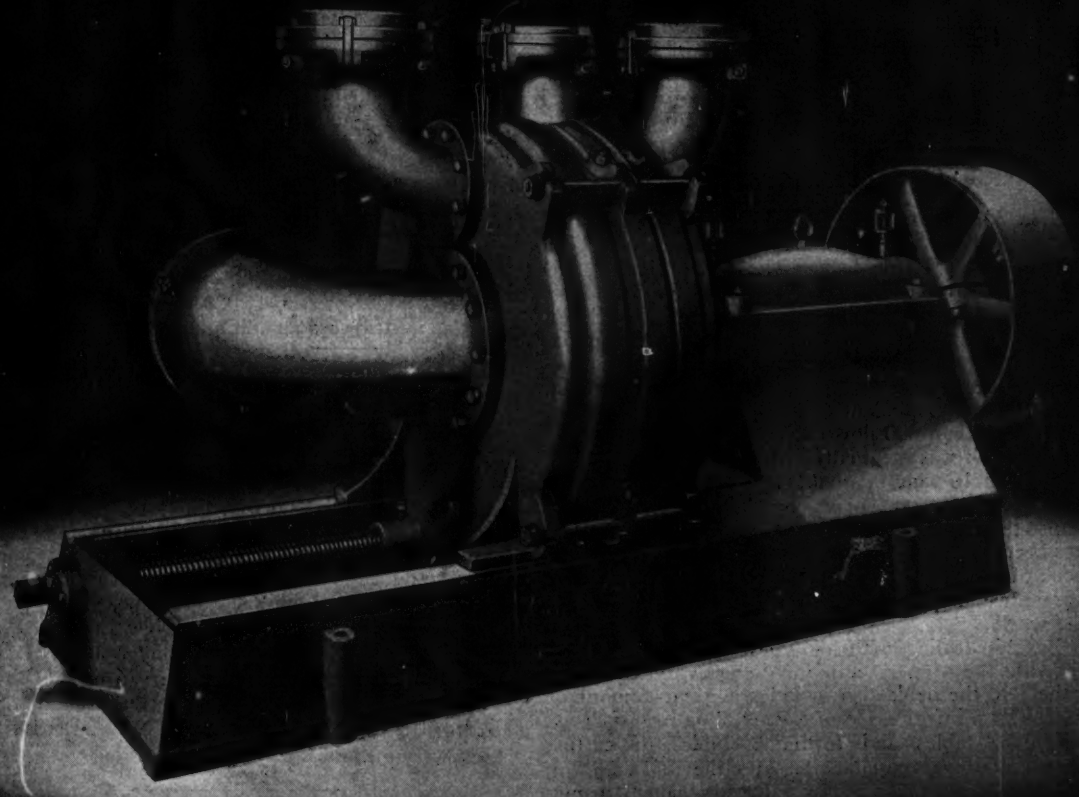
Prince Rupert, B. C.—F. L. Buckley, 3498 Osler street, Vancouver, B. C., at the head of a project to construct and operate a new sulphite pulp mill in vicinity of Prince Rupert, originally projected several months ago, is arranging for early call for bids on general erection. It will comprise a group of one and multi-story units, to be equipped for an initial capacity of about 250 tons of bleached sulphite pulp per day, with power house, pumping station and other mechanical departments. Completion is scheduled in 1938. Entire project is reported to cost over $5,000,000.

New Companies, etc.

Brooklyn, N. Y.—The Brooklyn Paper and Supply Company, Inc., has been incorporated with capital of $20,000, to deal in paper products of various kinds, including paper boxes and containers, paper cups, etc. New company is represented by Adolph and Henry Bloch, 285 Madison avenue, New York, attorneys.

New Haven, Conn.—The Fibre Can and Machinery Company, Inc., has been chartered with capital

Dilts



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of $50,000, to manufacture and deal in fiber boxes and containers, as well as equipment for the manufacture of such products. Incorporators include Joseph S. Miller, Henry D. Fisher and William R. Shaffer, 704 Whitney avenue, New Haven.

Brooklyn, N. Y.—Machinery and equipment at the plant of the National Eagle Paper Box Company, 1226 Flushing avenue, manufacturer of paper boxes and containers, was sold at public auction to a number of purchasers on August 3.

New York, N. Y.—The Alpina Paper Company, Inc., has been organized with capital of $10,000, to deal in paper products of various kinds. New company is represented by Max M. Nassau, 370 Seventh avenue, New York, attorney.

Chicago, Ill.—The Shellmar Products Company, 224 South Michigan avenue, manufacturer of cellophane products, has taken title to its plant building on St. Louis avenue, near Forty-eighth street, one-story, on site, 125 x 300 feet, heretofore occupied under lease from the Central Manufacturing District.

How to Run a Lathe

The 33rd edition of the well-known machinists' manual, "How to Run a Lathe", has recently been announced by its publisher, The South Bend Lathe Works, South Bend, Ind. The new edition of "How to Run a Lathe" has 160 pages containing the latest and most authoritative information about the fundamental operations of modern lathe practice. Instructions on every phase of lathe work are given in detail in easily understandable language and accompanied with more than 300 illustrations.

The book was originally introduced in 1907 in the form of a 16-page manual. In the last thirty years more than 1,500,000 copies have been printed and are in use throughout the world. "How to Run a Lathe" has been printed in four languages and is the standard book of instruction in technical schools, trade schools, apprentice shops, etc. in practically every country in the world.

Besides dealing with all types of lathe work and showing the proper setup for doing every kind of a lathe job, the book also includes a great amount of useful shop information of a general nature, such as: reference tables and formulae, tables of cutting speeds of metals, application of lathe tools, cutting screw threads, metric screw threads, taper turning and boring, milling and keyway cutting, bushing work, gear cutting, proper application and types of drives, shop hints and short cuts, etc.

Copies are priced at 25 cents each, and will be mailed postpaid anywhere in the world. Stamps or coin of any country are accepted. A copy may be obtained by writing to this magazine or to the South Bend Lathe Works, South Bend, Ind.

Cast Iron Pulleys for Power Transmission

A new 8-page illustrated list price Book No. 1622 has been completed by Link-Belt Company, Chicago, on the subject of cast iron pulleys for power transmission, giving pertinent data on solid and split, single and multiple arm machine-molded pulleys, with and without rubber lagging.

A copy of the book will be mailed to any interested reader upon request, which may be addressed to the nearest office of the company.

Japan Imports Pulp in Quota Basis

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., August 8, 1937—Imports of wood pulp into Japan both for paper making and the manufacture of rayon are on a quota basis for the current year, in accordance with regulations enforced under the Import Exchange License Law. This information from a recent report from Assistant Trade Commissioner Carl H. Boehringer at Tokyo.

Announcement was made in March that the Finance Ministry had approved the import during 1937 of 200,000 metric tons of pulp for paper making, this total being based upon estimates received from all importers. In the following month, however, this estimate was revised and importers appealed for permits for additional amounts aggregating up to 50,000 metric tons. In mid-May it was reported that the Finance Ministry had approved the requests allowing an importation during 1937 of 250,000 metric tons of wood pulp for the manufacture of paper. The total amount to be imported was apparently revised later to 300,000 metric tons. On March 31 announcement was made that official sanction had been given for the importation of 261,000 metric tons of wood pulp for rayon manufacturers during 1937. This amount was allotted as follows: United States, 120,000 tons; Sweden, 98,000 tons; Canada, 32,000; Finland and Norway, 11,000 tons. It is anticipated that permits for an additional 330,000 metric tons, and possibly 380,000 metric tons, will probably be granted in the near future.

Traffic Group Fights Rate Cut by South

[FROM OUR REGULAR CORRESPONDENT]

BOSTON, Mass., August 9, 1937—A special committee has been named by the New England Traffic League, backed by commercial and trade organizations, to fight the new Southern freight rate reduction proposal. This committee is composed of A. A. Raphael, traffic manager of the New England Paper and Pulp Trade Traffic Association; William H. Day, manager of the transportation bureau of the Boston Chamber of Commerce; A. H. Ferguson of the New Bedford Board of Commerce and N. W. Ford of the Connecticut Manufacturers Association.

New Advertising Manager

With the purpose of intensifying its advertising and sales promotion activities, the Standard Paper Manufacturing Company, Richmond, Va., has recently engaged L. Crampton Sossaman as its advertising manager. Mr. Sossaman has been associated with paper advertising for a number of years and is particularly well qualified for his new work.

Holyoke Mills Resume After Shut Down

[FROM OUR REGULAR CORRESPONDENT]

HOLYOKE, August 3, 1937—After a three days' shutdown the paper mills were able to resume operations Monday. During that period the Holyoke Water Power Company drew the water out of the canals as is done each year to allow of repairs to be made. No large undertaking was featured this year.

Printers want the uniform finishes of MOISTURE-CONTROLLED PAPERS

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COMING EVENTS IN THE PAPER INDUSTRY

TECHNICAL ASSOCIATION OF THE PULP AND PAPER INDUSTRY—Fall Convention, DeSoto Hotel, Savannah, Ga., Oct. 18-20, 1937.

NEW ENGLAND SECTION, Technical Association of the Pulp and Paper Industry—Third Friday of each month at the Nonotuck Hotel, Holyoke, Mass.

DELAWARE VALLEY SECTION, Technical Association of the Pulp and Paper Industry—Fourth Friday of each month at the Engineers Club, Philadelphia, Pa.

LAKE STATES SECTION, Technical Association of the Pulp and Paper Industry—Second Tuesday of each month at the Conway Hotel, Appleton, Wis.

KALAMAZOO VALLEY SECTION, Technical Association of the Pulp and Paper Industry—First Thursday of each month at the Park-American Hotel, Kalamazoo, Mich.

ACTIVE FALL FOR PAPER INDICATED

Operations of the paper industry in the third quarter to date, although reflecting the normal seasonal decline, have, according to the Standard Statistics Company, the well known statistical authority, held well above those of the corresponding period of last year. Indications are, moreover, that activity will continue above the 1936 level, despite the moderate uncertainties in a few divisions, principally paperboard, as a result of labor disturbances in consuming industries.

Labor relations in the industry itself have been harmonious, but some concern has arisen as to the fall and winter outlook for consumption of such items as paperboard in the event that any widespread outbreak of labor unrest should seriously curtail the shipment of goods and restrict purchasing power in certain communities. However, it is probable that this condition can be avoided, and all branches of the industry are expecting an active fall demand.

Despite the absence of important labor disturbances, labor costs in the paper industry have increased materially. In fact, one leading paperboard and container manufacturer has reported an average increase of 21 per cent in wages as compared with those prevailing at this time last year. This condition, together with the higher prices for practically all raw materials, has materially advanced the costs of manufacture of all forms of paper. During the past twelve months, however, demand has reached a level which has permitted capacity operation with a mounting backlog of orders and has supported sharply higher selling prices for all grades other than newsprint. In most instances, therefore, profit margins have been maintained, or even widened.

Paper companies during the first six months of this year enjoyed one of the best half year periods of operations on record. With general business expected to be active, a continuation of the improved earnings is indicated for the second half of this year, with profits of most companies likely at least to duplicate those of the first half. A few companies will show substantially higher earnings because of additions to capacity.

Two divisions of the industry, newsprint and kraft, hold the center of interest at present. Sharply higher prices are indicated for newsprint, although it is not yet certain whether the $50 a ton scheduled by most Canadian producers for the first half of 1938 will become the established price. Great Northern Paper, the largest United States producer, has not yet announced its price for 1938. The higher prices will bring additional facilities into operation, but demand is expected to be at levels high enough to absorb all production.

Since the price should be at least $5 above the $42.50 quotation of 1937, and since production will be greater, materially higher profits are indicated for newsprint producers.

The expansion of sulphate pulp, kraft paper, and paper board capacity in the South has caused some fear that capacity may become excessive.

At the present time, the chief question is whether or not demand for kraft products and board will expand sufficiently, principally in 1938, to absorb the added capacity. Considering that present capacity will be almost doubled by the end of 1938, it is difficult to see how the kraft and board division can go through all of next year without some degree of oversupply. Such a situation is likely even in the face of the fact that an increasing demand for Swedish kraft in Europe will probably lessen the supply available for the domestic market.

However, paper board, kraft products, and container manufacturers generally would prefer to avoid run-away prices for their products, since moderate prices tend to widen usage and encourage the substitution of these materials for other commodities. Thus, considering the lower costs of the southern mills, reduced prices for kraft products and board could prevail without seriously impairing earning power, if reduced prices stimulate demand for products as expected. Finally, it is possible that there may be occasional delays in the completion of additional units, and all the capacity scheduled for next year may not be completed in 1938. Earnings of kraft

and paper board companies, however, will probably be fairly well maintained.

In the other divisions of the industry—such as book and specialty papers—maintenance of favorable prices and good demand is indicated, with consequent satisfactory profits.

Paper Textbooks Going Strong

R. S. Kellogg, secretary of the Joint Textbook Committee of the Paper Industry says:

"The McGraw-Hill Book Company, publishers of the textbooks prepared by the North American Pulp and Paper Industry, report large sales of revised Volume III 'Preparation and Treatment of Wood Pulp.' This third revision of Volume III came out on February 9, 1937 and 915 copies of it were sold to June 30, with world-wide distribution. The greatly increased activity in pulp and paper this year is also reflected in the sale of 567 copies of the other four volumes of the textbooks during the first half of 1937.

"The aggregate sale of the five volumes since first publication in 1921 has now reached 26,900 copies. In the meantime, revision work is going steadily forward in order to keep up with progress in an industry which has always been characterized by progressive improvement in processes and mechanical equipment. Manuscript and illustrations for a complete revision of Volume IV is in the hands of the printers, and preparation of a similar revision of Volume V is rapidly proceeding. Volume IV covers 'Rags, Waste Paper, Beating, Loading, Sizing, Coloring, Paper Machines' and Volume V deals with 'Paper Machines, Paper Coating, Finishing, Testing, Mill Equipment,' hence there will be equally great interest in their contents and demand for them when they come from the press.

"Volumes I and II deal with preliminary subjects which must be mastered for thorough understanding of paper-making processes and mill equipment. They include mathematics, physics, chemistry, hydraulics and mechanics, with appropriate examples therein drawn from actual paper mill practice. That many students desire to improve themselves in these subjects is indicated by the sale of some 200 copies of these volumes during the first half of the present year."

A New Paper Center

The *New York Times* in its issue of last Thursday says that "Expansion of a downtown area into a wholesale paper center was indicated in a deal reported yesterday by Spear & Co., Inc., brokers, who leased the five-story building at 418-22 West Broadway, through to 94-96 Thompson street, to the A. G. Nelson Paper Company, now at 220 West 18th street.

"The Thompson street property, which was leased for the General Society of Mechanics and Tradesmen, will be modernized at a cost of more than $25,000. The changes will include a loading platform. The building contains 60,000 square feet.

"Spear & Co. recently leased 22,000 square feet in 149-53 Wooster street to the Peerless Paper Products Company, and 25,000 square feet in 468-72 West Broadway to the Superior Paper Company. The Ace Paper Company leased recently the entire building of 60,000 square feet at 426-30 West Broadway."

Production Ratio Report

These statistics are based upon paper production reports to the American Paper and Pulp Association:

The following statistics show the number of mills reporting by ratio groups:

COMPARATIVE MONTHLY SUMMARIES

Months	1937	1936	1935	1934
January	90.3% (c)	76.1%	65.8%	.....
February	90.1% (c)	77.9%	70.0%	.....
March	90.3% (c)	76.0%	70.5%	.....
April	92.1% (c)	82.3%	70.0%	.....
May	90.6% (c)	81.6%	69.4%	.....
June	87.4% (c)	80.7%	72.3%	.....
July	81.7% (c)	77.3%	64.9%	.....
August	.....	81.5%	70.9%	.....
September	.....	80.5%	71.9%	58.2%
October	.....	87.6%	75.6%	64.7%
November	.....	88.0%	75.3%	61.7%
December	.....	85.9%	71.2%	59.6%
Year Average	.....	81.3%	70.5%	.....
Year to Date:				
First 30 weeks	89.0% (c)	78.7%	68.9%	.....

COMPARATIVE WEEKLY SUMMARIES

CURRENT WEEKS, 1937		CORRESPONDING WEEKS, 1936	
*July 10	70.2%	July 11	75.6%
*July 17	88.5%	July 18	80.0%
*July 24	86.5%	July 25	80.3%
*July 31	81.6%	August 1	81.9%

* Subject to revision until all reports are received.
(c) Basic capacity data have been adjusted to correspond with ratings reported on January 4, 1937 Machine Improvement Survey.

The following statistics show the number of mills reporting by ratio groups:

	Number of Mills Reporting, Current Weeks			
Ratio Limits	July 10, 1937	July 17, 1937	July 24, 1937	July 31, 1937
0% to 50%	84	47	54	51
51% to 100%	229	254	244	159
Total Mills Reporting	313	301	298	210

Paperboard Operating Ratios

According to reports from the National Paperboard Association, per cents of operation, based on "Inch-Hours," were as follows:

Month	1937	1936	1935	1934	Month	1937	1936	1935	1934
Jan.	80% (e)	61%	61%	....	July	.....	69%	59%	....
Feb.	86% (e)	67%	67%	....	Aug.	.....	75%	65%	....
March	87% (e)	68%	67%	....	Sept.	.....	76%	69%	62%
April	89% (e)	70%	61%	....	Oct.	.....	82%	76%	63%
May	86% (e)	68%	61%	....	Nov.	.....	79%	70%	56%
June	.....	68%	65%	....	Dec.	.....	74%	60%	52%

Week end. June 5, 1937	76%	Week end. July 3, 1937	76%
Week end. June 12, 1937	82%	Week end. July 10, 1937	44%
Week end. June 19, 1937	71%	Week end. July 17, 1937	73%
Week end. June 26, 1937	79%	Week end. July 24, 1937	74%
Week end. July 31, 1937	73%		

(e) Basic figures revised to include new members of the National Paperboard Association.

Allen Abrams Gets D.Sc.

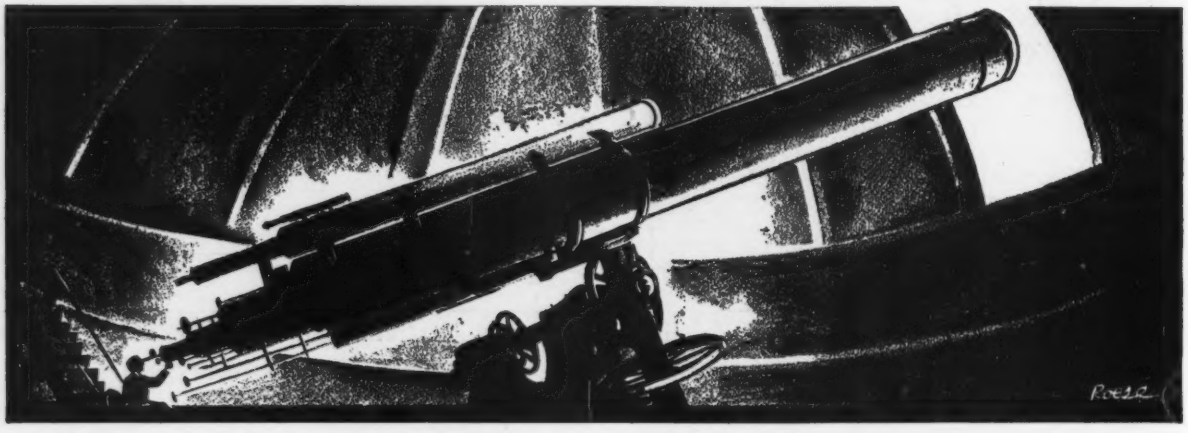
Allen Abrams, technical director, Marathon Paper Mills Company, Rothschild, Wis., was given the honorary degree of Doctor of Science at the recent Commencement of Washington and Jefferson College, at Washington, Pa. Dr. Abrams is well and widely known in the pulp and paper industry, being a prominent member of the Technical Association of the Pulp and Paper Industry and having served that organization as president in 1932 and 1933.

Dr. Abrams is an alumnus of Washington and Jefferson College, having graduated from that institution in the class of 1910.

William Duncan Goes With Union Bag

HUDSON FALLS, N. Y., July 2, 1937—Announcement is made that William Duncan has entered the employ of the Union Bag and Paper Corporation in his former position as superintendent of the Allen division. Since leaving this section he has held responsible positions in paper mills at Battenville and Orange, Tex. John T. Gamble, of Savannah, Ga., general manager of the plants of the company, has spent several days here transacting business.

BETTER METHODS . . . WIDER HORIZONS



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Section of the
Technical Association of the Pulp and Paper Industry

Edited by Ronald G. Macdonald, Secretary

Pulp and Paper Industry Literature Review

Abstracts of Articles and Patents Compiled by the Abstracts and Bibliography Committee of the Technical Association of the Pulp and Paper Industry, A. Papineau-Couture, John F. Ohlson, C. E. Peterson and Clarence J. West, Chairman

Copies of United States Patents can be obtained from the United States Patent Office, Washington, D. C., for 10 cents each. Send currency, not stamps.

Pulp and Paper Testing

Technical Viscosity Measurements. D. Krüger. Chem.-Ztg. 61, No. 3: 45-47 (Jan. 9, 1937).—Technical methods for measuring the relative viscosity of substances are still of a very empirical nature in spite of their frequency and importance for control; conversion methods for use in international exchange of goods are not yet fully satisfactory. Hence, efforts have been made for developing instruments for determining the absolute viscosity of even very highly viscous substances. A description is given of the Hoeppler falling sphere viscometer, the Ubbelohde viscometer with suspended level, the Kämpf viscometer for high viscosity ranges, and the limitations of these instruments. All of them do not indicate the true viscosity in the case of colloidal solutions or suspensions which exhibit structure viscosity. In conclusion, brief reference is made to the special problems offered by the viscosimetric evalution of cotton and wood pulp, such as the necessity of complete occlusion of oxygen during the entire procedure, the preparation and concentration of the cuprammonium solution, the purity of the cellulose, etc. The empirical character of these measurements is still more apparent in the case of the xanthogenate viscosity.—C.J.W.

A Rapid Method of Determining Cuprammonium Viscosity of Pulp. Elis Ennevaara. Pacific Pulp Paper Ind. 10, No. 11: 20-21 (Nov., 1936).—A detailed description is given of a rapid technic suitable for control purposes, but not intended to replace the standard procedure.—A.P.-C.

Influence of the Period of Pressure Upon the Swelling Capacity of Paper and the Relationship Between Swelling Capacity and Strength. Gösta Annergren. Svensk Pappers-Tidn. 39, No. 23: 433-439 (Dec. 15, 1936).—Continuing his previous investigation the author found again that the pressure applied to the couched sheet prepared from fibers beaten within the "critical beating phase" exerts a great influence upon the physical properties of the resulting paper. Strength properties (burst, tear, breaking length) and swelling capacity, however, are not affected to the same extent or in a direct ratio, which is illustrated in detail in a number of tables and graphs. which uses a blocking-layer photocell placed at a variable Factors which influence the results are the period during which pressure is applied, whether the sample is pressed between wet or dry sheets, and whether the pressure is released suddenly or gradually.—C.J.W.

The Evaluation of Starch Products Used in the Beater and Tub. J. P. Strasser. Paper Trade J. 104, No. 5: 35-44 (Feb. 4, 1937).—T. A. Pascoe, H. E. Nelson and C. A. Lightfoot have improved the Tappi standard method T420m for the determination of starch in paper by using alkaline ferricyanide solution instead of Fehling's or Benedict's solution, and titrating directly in the reduction flask without filtering; the technic is described. Data are presented and discussed on studies of starch used for beater sizing and for tub sizing—A.P.-C.

Notes on the Testing of Corrugated Cardboard. Lhomme et Argy. Pulp Paper Mag. Can. 38: 22 (Jan., 1937).—The actual area subjected to pressure in the Mullen tester is too small for the satisfactory testing of corrugated paper or cardboard; in such cases it should preferably be 100 sq. cm. The rate of applying pressure is not sufficiently defined by stating the number of r.p.m. of the hand (or motor-) driven wheel, as the diameter of the piston differs in different instruments; it would be defined more accurately by specifying the volume of liquid per sec. that is pumped into the pressure chamber. As the strength and stiffness of the rubber diaphragm affect the results, it is essential that the characteristics of the rubber be suitably defined and constant, which could probably be most practically accomplished by specifying the pressure which should produce definite deflection of the diaphragm, when placed in the instrument in the absence of the test specimen.—A.P.-C.

The Machine Direction of Paper. Belga. Papeterie 58: 1118, 1121 (Dec. 25, 1936).—A brief discussion of the importance of knowing the machine direction of paper with indications as to how to determine it.—A.P.-C.

Grease Resistance of Paper. H. L. Mellen. Paper Trade J. 103, No. 26: 29-31 (Dec. 24, 1936).—As a result of a collaborative study a standardized technic is proposed for the turpentine-transudation test of grease-resistant papers.—A.P.-C.

Measurement of Gloss with Photocells. A. Klughardt. Papier-Fabr. 34, No. 45: 409-411 (Nov. 8, 1936). —An apparatus for the measurement of gloss is described

which uses a blocking-layer photocell placed at a variable angle relative to the sample. Gloss is then assumed proportional to the logarithm of the ratio of reflectance of the sample when viewed perpendicularly to its surface, to that of the sample viewed at an arbitrary angle. Examples are cited.—C.J.W.

Instrumentation Studies. I. A Report of the General Grading Committee of the American Pulp and Paper Association. Instrumentation Program. Ernest Maher, et al. Paper Trade J. 103, No. 25: 38-43 (Dec. 17, 1936).—A discussion of the philosophy and method of approach of the development of suitable paper testing equipment and the fundamental properties of paper, together with brief abstracts of the detailed studies that have been made at the Institute of Paper Chemistry, Appleton, Wis., of certain properties and instruments.—A.P.-C.

Instrumentation Studies. II. Definitions of Properties of Paper. Otto Kress and Howard Morgan. Paper Trade J. 103, No. 26: 32-35 (Dec. 24, 1936).—Definitions are given of the principal physical and mechanical properties of paper.

Instrumentation Studies. III. The Evaluation of Formation by the Thwing Formation Tester. Staff of the Institute of Paper Chemistry. Paper Trade J. 103, No. 27: 29-31 (Dec. 31, 1936).—A description of the basic principles of the formation tester, developed in the labs. of the Kimberley-Clark Corp. (M. N. Davis, W. W. Roehr and H. E. Malmstrom, *Paper Trade J.* 101, No. 4, 31-36 (July 25, 1936). The results of an experimental study of the application of the instrument to the grading of various types of papers indicated that the reliability of the instrument is well established.—A.P.-C.

Instrumentation Studies. IV. Correlation of Thwing Formation Readings To Visual Formation Gradings By the Mead Standards. Staff of the Institute of Chemistry. Paper Trade J. 104, No. 1: 39-41 (Jan. 7, 1937). —It is shown that the Thwing formation tester measures the same property that is visually graded as formation. A correlation has been established showing that 4.5 Thwing units are equal to 1 visual unit, or 22.5 Thwing units are equal to a difference of 5 on the visual scale.—A.P.-C.

Instrumentation Studies. V. Report on Gloss. Staff of the Institute of Chemistry. Paper Trade J. 104, No. 1: 42-45 (Jan. 7, 1937).—From a discussion of the principle of glossmeters and of data obtained therewith it is concluded that: the value of a variable-angle instrument is doubtful, and a fixed angle instrument is to be preferred; the angle chosen should not be too high (over 25°) nor too low (below 10°); as the angle of incidence of the light on the paper decreases, total reflection, specular reflection and surface smoothness effect are increased, and diffused reflection, color effect and opacity effect are decreased.—A.P.-C.

Instrumentation Studies. VI. The Modified Oxford Glarimeter. Staff of the Institute of Paper Chemistry. Paper Trade J. 104, No. 2: 42-44 (Jan. 14, 1937).—A brief outline of the work which led to recommending the adoption of the modified Oxford glarimeter, using parallel light and a constant angle of 15°—A.P.-C.

Instrumentation Studies. VII. Comparative Study of the Bausch and Lomb Glossmeter and the Ingersoll Glarimeter. Staff of the Institute of Paper Chemistry. Paper Trade J. 104, No. 2: 45-47 (Jan. 14, 1937).—Comparative readings with both instruments on 72 samples of coated book paper showed considerable discrepancies. This is shown to be due to the fact that the Bausch and Lomb instrument measures $S^2 + D^2$, and the Ingersoll measures $S^2/(S^2 + D^2)$, in which D^2= intensity of diffuse reflection and S^2 = intensity of specular reflection.—A.P.-C.

Color Matcher. Earl D. Wilson and Carl C. Hein, assignors to Westinghouse Electric and Manufacturing Co. U. S. pat. 2,046,714 (July 7, 1936).—Light from a tungsten-filament incandescent electric lamp (which, in conjunction with three color filters, provides red, green and blue light) is projected on the sample, and a special integrating chamber is provided wherein only the diffusely reflected light from the sample impinges on a photo-cell which controls an amplifier and an indicating microammeter. A voltage regulator is interconnected between the alternating current service line and the device to eliminate variations in illumination. The microammeter has a scale of limited length, and a special sensitivity control permits of placing the scale in any portion of the range of the instrument as required. The photo-cell is preferably of the cesium oxide type.—A.P.-C.

Moisture Testing Device. Charles O. Fairchild and James P. Henderson, assignors to Charles J. Tagliabue Manufacturing Co. U. S. pat. 2,063,840 (Dec. 8, 1936).—The moisture content of loose or comminuted material is determined by measuring its electrical resistance. A number of needles are used as electrodes and means are provided for compressing the material to be tested about the electrodes to obtain a large and uniform area of contact. The test results are compared with those obtained with samples of known moisture content used as standards, or are substituted in an empirical formula derived from such standards.—A.P.-C.

Apparatus for Measuring the Stiffness of Flexible Materials. Ralph F. Taber. U. S. pat. 2,063,275, (Dec. 8, 1936).—The invention is an improvement on the Smith tester (patent pending). It provides a pair of relatively movable members for bending the test strip with suitable means for limiting the movement of the members in each directions relatively to each other. A separate handle or lever, that may be operated either manually or mechanically, is provided for operating one of the members. The motor used for mechanical operation is controlled so that it will stop automatically when the strip has been flexed the desired amount, and signalling means are provided to indicate when this stage has been reached. Means are provided for measuring both the initial and basic stiffness of the material so that the amount of plastic flow can be determined and the elastic properties of the material calculated therefrom.—A.P.-C.

Device for Rapidly Making Cross Sections of Fibers. John I. Hardy. U. S. pat. 2,048,335 (July 21, 1936).—This is an improvement on Hardy's U. S. pat. 2,011,444, of Aug. 13, 1935, and provides means for rapidly obtaining good, thin cross-sections of a large number of fibers, instead of a single fiber as with the device described in the previous patent.—A.P.-C.

Sulphite Process

Disposal of Sulphite Waste Liquors in Konigsberg, Prussia. F. Hurdelbrink. Vom Wasser 10:54-59 (1935).—The author describes the purification of the sulphite waste liquor by filtration through ground filters; the pollution of the Haff by the high sulphur content of the effluents is thereby appreciably reduced.—C.J.W.

The Textile Chemistry of Sulphites. P. E. Hattinger. Am. Dyestuff Reporter 25:609-612 (1936).—Application of liquid sulphur dioxide and of sulphites in the textile industry are pointed out and the effect of sulphite on the properties of wool is indicated. Several patents are briefly discussed. Sulphite waste liquor serves as a reducing agent for the vat to replace hyposulphite, even successfully stripping fabrics dyes with indigo.—A.P.-C.

What May We Expect of Starch?*

By R. M. Cobb[1], Donald V. Lowe[2], Emil Pohl[3], W. Weiss[4]

Abstract

It is shown in this paper that the user of starch may expect that:—

1) As adhesive, he will have to use more starch, sp. gr. 1.62, than of lighter adhesives such as casein, sp. gr. 1.26, for a given purpose.

2) In a given time, at a given contact angle, starch will penetrate a sheet inversely as the square root of the viscosity of the solution.

3) Starch will slow down sheet formation.

4) Starch will reduce the per cent solids present in the sheet after wet pressing, but increase, in most cases, the per cent solids present in the dried sheet.

5) The function of starch in strengthening the sheet, therefore, is to increase contraction on drying or to bind fiber to fiber.

6) Use of excessive amounts of starch will cause crushing.

7) If starch is not too degraded, the per cent required to give maximum strength to the sheet lies around 0.5 per cent.

8) It is also shown that:—The fact that strength tests go through a maximum indicates that starch as a sheet-making material is lower in strength than cellulose fiber. Its reinforcing action is similar to that of glues which yield a joint stronger than the glue itself in mass.

9) The fact that solid fraction values go through a maximum indicates that beyond a definite point the embedded starch can not compensate for the increased water content of the wet pressed sheet. The starch can not induce the contraction of fibers beyond a certain point; or else the starch structure itself is honeycombed with air after drying and is therefore weaker than the cellulose structure.

Starch Cellulose Relations

Starch and cellulose are so closely related that the difference between them has not even been made clear. Cellulose and starch ($C_6H_{10}O_5$) both derive from plant sugar, and when degraded both go to sugars by hydrolysis. Until they are hydrated, starch and cellulose display no adhesive power. But upon beating, cellulose fibers hydrate, developing an almost mysterious adhesive force which binds fiber to fiber upon drying. And starch suspensions in water hydrate on heating; the particles swell, burst, and give a paste with strongly adhesive qualities.

Intuitively one would expect that a heavy starch solution would in some measure correspond to a heavily beaten and hydrated fiber furnish; and that starch, by reason of its close relationship to cellulose, would be a natural reinforcing agent for a cellulose sheet. The addition of starch adhesive at the wet end, which has been made for generations, might be thought in some measure to correspond to addition of cellulose slime.

It is the object of this presentation to outline what we may expect of starch in general as a papermaking material, and to interpret some laboratory data which have bearing on the application of starch at the wet end.

Physical Characteristics

Except for its important chemical property of giving an unmistakable characteristic blue color with iodine, starch is much more interesting to the papermaker in its physical than in its chemical properties. The physical characteristics which indicate what we have a right to expect of starch are its specific gravity *1.62* to *1.65* and its viscosities in aqueous dispersion. This includes the variations in viscosity with concentration, chemical and heat treatment; and the effect of these variations on the behavior of starch as applied to paper. The viscosities of starch solutions recorded in the literature vary from 0.90 to 100,000 centipoises.

Specific Gravity

Although cellulose and starch have the same empirical formula, they differ in linkage and in specific gravity. The apparent specific gravity of cellulose fibers as we find them is around 1.5 to 1.55, according to Doughty *(4)*. Starch is a little heavier, as indicated above, a fair average being 1.64, according to Eymm *(5)*.

The specific gravity is of importance chiefly when starch is being compared with other adhesives of similar character. Engineering strength measurements are ordinarily made on blocks of standard size and dimension. Because coating adhesives are dispersed in indeterminate shapes, sight is lost of the fact that comparison of their strength should probably be made on a volume and not on a weight basis.

For example, in comparing the binding power of casein with that of starch, 10 parts of casein (sp. gr. 1.26) have the same volume as 13 parts of starch (sp. gr. 1.64). If then the strength of starch were equal, in the commonly accepted dimensional sense, to that of casein, still 21 parts of starch by weight would be needed to impart the same strength to a coating as 16 parts by weight of casein. It is, therefore, asking rather much of starch to expect it to replace a lighter material, pound for pound.

Viscosity

The viscosity of starch solutions is of particular import in tub-sizing, for other things being equal, the penetration of starch follows the equation presented elsewhere by Cobb and Lowe *(1)* and by Cobb *(2)*.

$$l^2 = \frac{r\,\sigma \cos\Theta\, t}{2\mu} \qquad (1)$$

where

l = depth of liquid penetration in cm.
r = paper pore radius in cm.
σ = surface tension of liquid in dynes/cm.
$\cos\Theta$ = cosine of angle Θ taken by liquid in contact with solid.
t = time of penetration in secs.
μ = coefficient of viscosity in poises. μ Water = .01006 poise at 20 deg. C.

or, the degree of penetration of starch into the sheet at the size-press, all other things being equal, varies inversely as *the square root of the viscosity of the starch dispersion.*

The viscosity of starch solutions affects the rate of flow of any stock suspension to which they are added. It was found during this investigation that time of drainage of stock upon a wire is greatly increased at viscosities above

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1.5 centipoises. In between 1 and 1.5 centipoises, starch may be used to advantage to slow down the drainage of stock which is too free.

While the assumption that the more viscous the starch, the greater its strength is not always valid, still the viscosity of the starch solution plays an important part in its behavior on drying.

A viscous starch has not been degraded.

A viscous starch retards drainage and more of it may be retained because of the lowered rate of water flow, which tends less to dislodge it. Viscous starch may also be better retained because of its natural tackiness.

Sjostrom *(9)* points out that, "The viscosity of the starch is not the viscosity of a homogeneous liquid. The paste is largely a suspension of whole and disintegrated granules. The reduced tendency to hydration means that the granules, when heated with water, increase in volume less than granules from ordinary starch. In a thin-boiling starch paste the room occupied by the suspended starch is therefore smaller in relation to the total volume . . . and the paste is correspondingly thinner. Other factors affect the difference in fluidity between thick- and thin-boiling starches, but this relation of volumes is without doubt the most important."

A more viscous starch, then, swells to a greater degree so that its swollen particles attain greater size than the particles of thin boiling starch. When a more viscous starch dries, it may

1) Contract to less apparent volume than would an equivalent quantity of thin boiling starch. In this case it could cause greater contraction of the paper sheet in which it was imbedded, than would thin boiling starch; thereby bringing about greater increase in sheet strength.

2) Contract to a greater apparent volume than would an equal quantity of thin-boiling starch. In this case the structure of the viscous starch could not be solid after it had dried, but honeycombed with air. Under these conditions, a viscous starch might not contract and strengthen the paper as much as would a thin-boiling starch; on drying, a viscous starch might even weaken the structure of the sheet in which it was imbedded.

A Study Which Avoids Retention Complications

The whole problem of studying the action of starch in paper is complicated by the fact that by changing the viscosity of starch, one affects both the amount taken up or retained, and the characteristics of what starch is retained or taken up. If results obtained with one starch are better than those obtained with another, it is not at once clear whether (1) there is more starch in the paper, or (2) that what starch there is in the paper, is doing a better job. Even when a quantitative estimation of the starch is made, results are not certain until the amounts are manipulated to give equal retentions or take-ups by the starches being examined.

It was the object of this investigation to develop a method for testing starches or other reinforcing agents under such conditions that retention would not enter as a complication. In this way, it was hoped to learn what we may expect of starch if we do get it into a sheet of paper. How to get it into the paper has been already discussed by Patilloch *(6)*, Rowland *(7)* and others.

Experimental Procedure

The procedure was extremely simple. 7 gram hand sheets were formed in the Noble and Wood sheet machine, described completely by Coghill *(3)* last year, using a suction pump in parallel with gravity. Instead of being formed with just water in the mould, the sheets were formed at 25 deg. C. from starch solutions varying in strength from 0.25 to 5 per cent. Enough 10 per cent starch solution was introduced into the mould to make the desired strength when the entire volume of forming water was in there, and the sheets were made and dried in the regular manner.

By noting the wet and dry weights of each sheet, and knowing the strength of starch solution used in sheet formation, it was possible to calculate the weight of dry starch associated with the dried fibre.

Wt. wet.	Wt. dry	Wt. solu.	Wt. solu. gram fiber	Per cent starch solu. in mould	Per cent starch in paper
17.50	7.00	10.5	1.5	1	1.5

Selective adsorption may throw these calculations in error, but as a first approximation they give a very simple method for comparing the behaviour of different starches, without worry as to whether any starch has been retained in the hand-sheets.

(NOTE—Since this paper was written the article by Strasser *(8)* has appeared indicating that no selective adsorption of starch was found during investigation by the Paper Institute.)

Starches Investigated

Untreated tapioca, enzyme-treated tapioca, and thin-boiling cornstarch were compared. In order to get the highest possible per cent of starch into the sheet, a freely draining unbleached sulphite, beaten two hours in the Niagara beater was employed in making the test sheets.

The treated starches were made up to 10 per cent solutions, heating for 10 minutes at 73 deg. C. The enzyme treated tapioca had to be heated to 85 deg. C. to kill the action of the enzymes after the 10 minute treatment at 73 deg. C. The untreated tapioca could be made up only to 5 per cent concentration.

TABLE I.—CHARACTERISTICS OF STARCH SOLUTIONS

Starch solu.	Per cent enzyme broth	Apparent viscosity 25 deg. C. Centi-poises	Drainage time in secs. 7 gram sheet— Per cent starch in mold varied 0%	0.015%	2%	5%
5 per cent Royal Tapioca	0.0	Paste	16	34	...	...
10 per cent Royal Tapioca	0.5	43	..	..	...	...
10 per cent Royal Tapioca	1.0	10	11	..	28.5	300
10 per cent Royal Tapioca	1.5	4	14.8	..	22.0	...
10 per cent Royal Tapioca	2.0	3	10.6	..	12.8	14.6
10 per cent Clearsol.....	..	3	23	6	26.4	200

Under ideal conditions, the investigation would be carried out to the point where the resulting sheet would be almost 100 per cent starch. But because of crushing and slow drainage time, not more than 5 per cent starch could be used in the sheet mould, giving a maximum of 10.5 per cent starch on the weight of the fiber.

General Results

There were a few results obtained with all starches to greater or less degree:

1) Starch slowed down sheet formation. (Table I).

2) Under fixed conditions of formation, the per cent of solid by volume present after the sheet was wet pressed, decreased as the per cent of starch increased. This decrease in solids was almost linear. (Fig. 1).

3) The sheets made with the highest percentages that could be used of each starch, tended to crush.

Sheet Tests

All sheets were tested for mullen, ply strength, and per cent solids. The ply strength was determined on a special attachment designed for the Thwing tester. It measured strength of fiber-to-fiber bond in the plane perpendicular to the surface as first described by Sutermeister. The per cent solids were determined by finding the amount of kerosene absorbed overnight by the sheets tested, after "dusting" them off gently with a cloth to remove excess

liquid. From the per cent solids and the sheet weight, the gage of the sheets was calculated. Mullen was expressed on the basis of a 0.010 inch thickness. This dimensional basis for expression is not only sounder than a weight basis from the engineering point of view, but it alone serves to bring out the effect of high solid fraction; expressing mullen on a weight basis masks the effect of high solid fraction effects.

The results of the different starches on mullen, ply strength, per cent solid after wet pressing, and per cent dry solid, are shown in Figs. 1, 2, and 3.

Effect of Starch on Sheet Strength

If starch is stronger than cellulose, it will reinforce the strength of a sheet of paper by an action similar to that of steel rods in concrete.

If starch is no stronger than cellulose fiber, or even if it is weaker, it may still reinforce the sheet in two ways:

It may cause greater contraction of the wet pressed sheet on drying, giving a stronger dry sheet of higher solid fraction.

Or it may bind fiber to fiber tightly without increasing solid fraction.

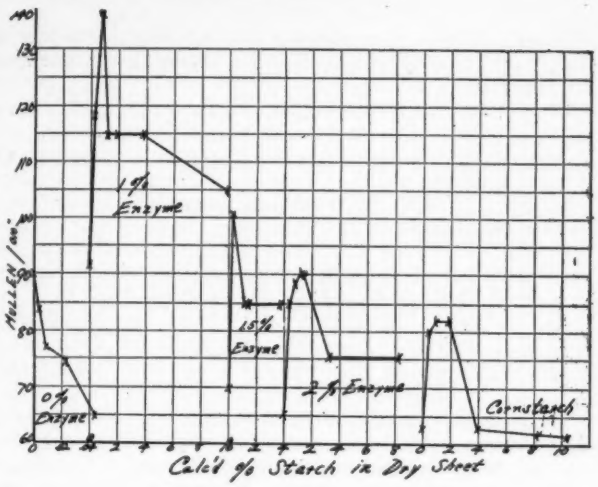
Before commencing this investigation it seemed that any one of the above factors might be paramount.

Examining the curves, the first point of interest is the effect of starch on the wet pressed sheet. One should expect starch, acting like highly hydrated cellulose, to increase the water content before drying. And from the solid fraction curves (Fig. 1) it is clear that it does.

The dry solid-fraction curves are less simple (Fig. 1). Untreated tapioca decreases the dry solid fraction, and the 1 per cent treated starch is akin to untreated tapioca for it reduces solid fraction on the first part of the curve. The other solids increase through a maximum. This means that up to a certain point, the contracting power of starch in the sheet can offset the greater water content of the wet pressed sheet. Beyond that point, one may surmise that starch either pulls away from the fibers that cannot contract with it, or that it dries in a hollow-like manner decreasing the dry solid fraction.

The mullen test results shown in Fig. 2 presents two points of importance.

The curves, showing a striking similarity in shape, go through a maximum at a low per cent of starch, averaging 0.5 per cent. And with one exception, the mullen tests follow the dry solid fraction curves very closely. The fact that the curves go through a maximum would indicate that starch is weaker than cellulose. And the fact that the mullen test follows the dry solid fraction would seem to indicate, that in increasing mullen, starch acts by contracting the sheet to a higher solid fraction.



Mullen vs. Per Cent Starch in Sheet.
FIG. 2.

It is of interest to note, in confirmation, that if the mullen data of Weber, Shaw, and O'Leary *(10)* are calculated on a .010 inch thickness basis, and plotted against the per cent starch, the curve will go through a distinct maximum at 0.5 per cent starch.

Fig. 3 shows the effect of starch on the pick test. This test indicates the strength of the paper in plane at right angles to the surface, the fiber to fiber bond.

The interesting point about the pick test is that it does not follow solid fraction except in the heavily treated starches. The discrepancy is particularly marked in the case of untreated tapioca. The curves go through or to a maximum at a low per cent of starch. From their shape and their deviation from dry solid fraction, one should be inclined to conclude that in reinforcing resistance to picking, starch acts by binding fiber to fiber, somewhat independent of the solid fraction.

Summary

A method has been outlined for determining the value of starch of any viscosity imbedded in any sheet furnish.

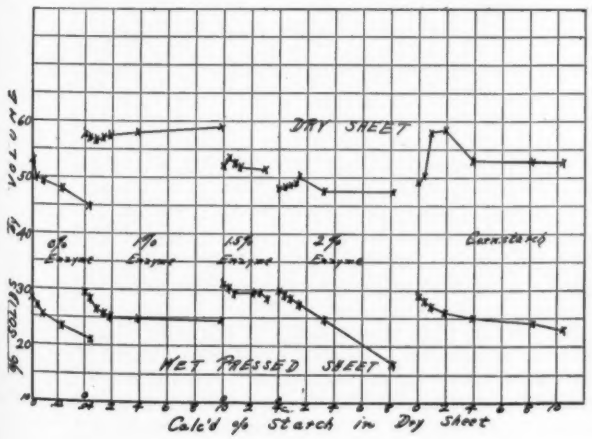


FIG. 1.
Per Cent Solids by Volume vs. Per Cent Starch in Sheet.

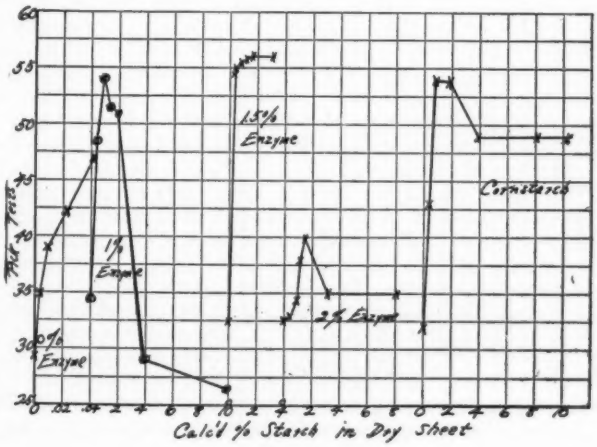


FIG. 3.
Pick Test vs. Per Cent Starch in Sheet.

Starch, similar in constitution to cellulose, acts like a highly hydrated cellulose. It is weaker than cellulose and increases sheet strength by increasing the shrinkage of fiber structure to give a higher sheet density; starch also exhibits adhesive power independent of sheet density.

The strength imparted by starch reaches a maximum at a definite concentration in the sheet. The maximum occurs around 0.5 per cent and should be determined by the user to get the optimum results.

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Standard Methods and Water Standards*

By Harry E. Jordan[1]

In the middle ages, one of England's learned men said that water was of good quality if it "cooked pot herbs well". One of the participants in this discussion had much to do with the demonstration, in the canning industry, that use of a zeolite softened water produced tender canned green beans.

Incidental to research on cancer a brilliant research man has shown that the permeability of protoplasm is increased in a sodium-water medium and decreased in a calcium-water medium. Thus we bridge within a few sentences the distance from the medievalist who observed that some waters were suited to the cooking of vegetables, others not, and the two modernists who demonstrated scientifically that the nature of the electrolytes dissolved in water governs the texture of the material exposed to the water solution. Actually it is within the space of less than a century that we have travelled the distance from an altogether empirical basis of determining water quality to the present state of reasoned knowledge. The next generation or two will doubtless clarify many of the points where our present reasoning is not altogether clear. For many years, I have had upon the wall of my office, the handwritten report of an analysis of a well water, made by J. Laurence Smith in 1871. This report noted that there were about 17 grains of total solids in the water, that the chloride content was low and then went on to say that the ammonia test had been performed. This "the most delicate and the most modern test" (so the report stated) was made by heating the residue from evaporation to a dull redness. "No odor of ammonia was observed" so the chemist reported—therefore he concluded that the water was safe. We shall not disturb this long last rest by critical comment upon the value of such technique.

As the century drew toward a close Mason, Leffman and Nichols were building more reasoned methods of water examination in this country. In Germany, Koch and in England, Frankland were applying the bacteriological researches of Pasteur to the control of water purification and the development of routine methods of testing. In the mid-nineties, G. W. Fuller left the Lawrence (Mass.) experiment station and engaged in a study of water treatment methods at Louisville, Ky. The report of his investigation of 1895 contains one of the first assemblies of chemical methods for water examination, couched in modern terms.

Meanwhile, following a meeting of the American Public Health Association where certain informal discussions of laboratory methods were had (and tradition has it that they took place in a barroom) Dr. J. George Adami of Montreal addressed Doctors Welch of Baltimore, Prudden of New York, Abbot of Philadelphia, Vaughan of Ann Arbor, Billings and Smart of the Army in Washington, Sedgwick of Boston and Fuller asking their opinion as to the feasibilty of preparing a manual of standardized methods for bacteriological examination of water. The fruit of this inquiry was the 1897 "Report of the Bacteriological Committee" to the Laboratory section of the A.P.H.A. Various revisions of this report were made and then in 1905 there was issued the first edition of "Standard Methods of Water Analysis" combining the final report of the bacteriological committee with the methods of chemical examination essentially as they were given in Fuller's Louisville report. Thus there was developed the first manual of water examination, not in the form of a monograph written by some individual, but the coordinated opinion of a group of leaders from various parts of the continent, expressed through their national organization formed for the advancement of public health.

It is of interest to note that in the British field, no comparable document issued until 1934. In that year the Ministry of Health issued Bulletin 71, entitled "The Bacteriological Examination of Water Supplies". While many monographs on water examination have been written in England, and while the reports of the Director of Water Examination of the Metropolitan Water Board (of London) are a highly valuable record, no document has previously existed in the nature of a nationally produced and nationally agreed upon manual of analytical methods.

One fine feature of the American Manual is that it has never been considered a completed document. The editorial or revision committees have been continuous. As soon as one text is issued, the committee continues its critical contact with the field, appraising new methods which may be presented, discussing the revision of old ones in the text and laying the ground work for a new edition

Revisions of the first or 1905 text appeared in 1912, 1917, 1920, 1925 and 1933. The eighth or current edition appeared in 1936 and plans now look forward to the 9th edition in 1941.

Cooperation of Interested Organizations

In the meantime, the organizations cooperating in the work have increased. In 1920, the American Chemical Society appointed a committee to cooperate in the preparation of the text. That committee continues. In 1925, George W. Fuller, who had been most active in the preparation of the original A.P.H.A. report negotiated a change in publication sponsorship, and the A.P.H.A. united with the American Water Works Association in the work. That arrangement continues. In 1932, a reorganization was effected which resulted in the creation of a joint editorial committee. Three members are appointed to it by the A.P.H.A. and three by the A.W.W.A. The chairmen of the research committees of the two associations join in appointing the chairman of the joint editorial com-

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mittee. The text is prepared by the committee under direction of its chairman, is approved by the research control committees of each association and is published by the A.P.H.A. The members of the committee at present include the chairman of the American Chemical Society co-operating committee, the chairman of the A.P.H.A. Laboratory section water analysis methods committee, the chairman of the Committee on analytical methods of the Federation of Sewage Works Associations, the past chairman of the inter-association Joint Boiler Feedwater Research committee, a representative of the Canadian Institute of Chemists and the writer. The present edition is divided into seven standard methods sections and two provisional methods sections. The standard sections cover, sanitary chemical methods, mineral examination methods, sewage methods, sewage sludge methods, microscopical methods for water, microscopical methods for bottom sediments and bacteriological methods for water and sewage. The provisional methods section include in one section, the water and sewage methods and in the other, methods for the examination of swimming pool water.

Reference was made above to the fact that revisions of the text are frequent. Certain concepts governing revision need to be kept in mind. It has never been considered that "Standard Methods" was a text for the beginner. In other words, editorial work has always been carried on with the idea that the person who used the text possessed a prior knowledge of qualitative and qualitative chemical analysis and basic biological laboratory technic. On the other hand, it is not a manual for the research specialist, if such a thing could be imagined. A recent British journal contained a review of the present edition of Standard Methods which among other things said "The very virtues of such a work also tend to make it a reactionary rampart against the reception of new ideas by those who use it for routine purposes."

In so far as routine work is concerned the committee perhaps pleads guilty to building a rampart. If the examinations of waters in Maine and Montana, California and Carolina, Ohio and Ontario are to be subject to comparison, the routine methods at any time must be uniform in all these states and provinces. That is just exactly what Fuller and his associates were attempting in 1894 and what the committee still attempts to obtain.

Research in Water Analysis

But it has never appeared that the research chemist has been hampered by this. He has gone forward from this simple and routine background to the development of special techniques to meet the problems of his particular locality and industry.

Certain recent developments have demonstrated how new problems promote research, new methods are applied to one problem and then standardization of these methods for general use follows. In the last ten years the water supply field has become newly taste and odor conscious and has developed methods of taste improvement.

The application of such materials as activated carbon and ammonia to water treatment involved increased costs. The use of a material which increases costs must be measured with some degree of accuracy. Odor tests which were only qualitative have been found inadequate. The researches of Spaulding, Baylis and others have transformed the simple qualitative odor test into a quantitative threshold odor test. These men, faced with the special problem, did not confine themselves to the routine, but went forward to develop a new technique. Now that the improvement of taste and odor in water supplies is practiced over the entire continent, the new quantitative method of odor determination has been included in the 8th edition of Standard Methods.

The difficult problem is to discard old methods. The text still contains tests for ammonia, not those of J. Laurence Smith but more workmanlike methods from the old Lawrence, Massachusetts research laboratory. They were developed before the days of water bacteriology. Much reliance was placed upon them. They were always empirical tests. They do not determine a thing which is in itself harmful. They simply, if the routine is followed, determine a material which has become inferentially associated with pollution. Modern ammonia taste control treatment adds quantities of ammonia that would have made the analyst of the nineties run up the red flag of condemnation.

The test appears to have some value in stream pollution studies, but in all probability, it could be removed from the routine of every water or sewage laboratory and operations controlled just as well by other methods available.

One problem is always with us—debates over the accuracy of methods without thought as to the meaning of the results obtained. One example will suffice. Two very earnest laboratory men have developed a new method of preparing the alkaline permanganate solution used in the albuminoid ammonia determination. They have published the method and feel considerable grievance that the committee did not substitute their method for the old one. But the committee frankly was not greatly concerned with the determiniation in toto. No one knows what albuminoid ammonia actually means.

It is simply the term which was applied years ago to the ammonia which could be distilled off from water or sewage after alkaline permanganate had been added.

It is found in normal tap water to the extent of only a fraction of a part per million. So the committee agreed that there was not much to be gained or lost whatever method of making alkaline permanganate was used.

Two Kinds of Test Methods

W. D. Collins has suggested that analysts should keep in mind the fact that there are two kinds of methods. One attempts to evaluate the actual amount of a certain material, such as calcium. Intrinsically, there is just so much calcium in a liter of water. Our efforts are designed to estimate that amount with the highest degree of accuracy possible. The other type of methods he terms "definitive" in that the method itself is a definition of the thing being determined.

The oxygen consumed test is one. The total solids test is another. (That may shock some of you—we will return to that) The test for free or residual chlorine is another (Perhaps you are shocked again). The bacterial count or the determination of the coli-aerogenes group is another (Is that enough shock?) The fact is that the result of the oxygen consumed test depends entirely upon precise conformance to routine. Any other routine will produce another result and the test is an entirely empirical one. Total solids found depend upon the temperature of drying. At 100, 103, 150 or 750 deg. C. Each will produce a different result. The orthotolidine test for residual chlorine is not a specific test for chlorine, but is affected by any oxidizing agent present. Nitrites, ferric and manganic compounds, or algae will modify the result.

Bacterial counts or the estimations of coli-aerogenes organisms present are only comparable when the growth supporting material, time and temperature of incubation and technic are as alike as possible.

All this would appear to discredit standard methods. I think the opposite is true.

It indicates that standardization, conformance to routine, meticulous attention to detail must be had if results are useful.

Processes under control, water supplies undergoing

purification would both suffer if the laboratory control was individualistic rather than standardized.

Perfection in methods has not been reached. Points of weakness in the current standard text are known to exist. But over a forty year period laboratory workers in water supply in the United States have grown to operate according to the routine laid down in standard methods; courts have grown to accept them as satisfactory without detailed explanation and the U. S. Public Health Service stipulates their use in determining water quality.

In so far as the control of water supply in industrial processes is concerned it would appear that more is to be gained by the conformance to nationally standardized technic than by the preparation of special methods for that industry alone.

Standards of Quality

Just as the medievalist tested water by its ability to cook pot herbs well, so he at the same time set up a standard of water quality.

And in the time between, many standards have been set up which have less rational background. Many cities adopted standards of water quality thirty or forty years ago in the heyday of the advance of sanitary science. Most of them were in impossible terms.

It was not until 1914 that the U. S. Public Health Service promulgated its first standard for drinking water used on interstate carriers. It required that not more than 100 bacteria per c. c. be found in the water and that not more than 1 of 5 to 10 cc. portions contain the coli-aerogenes group of organisms.

It was later admitted that the phraseology of this standard was indefensible from a mathematical standpoint.

In 1925 the present standard was promulgated which eliminated the bacterial count and rephrased the section relating to coli-aerogenes group presence in such a way as to take care of mathematical irregularities.

The standard briefly interpreted "implies that the mean density of Coli-aerogenes group organisms shall not exceed about 1 per 100 cc."

In an appendix to the standard, is a section on chemical tolerances. They were not officially adopted and have remained during the 12 years past as a sort of unofficial reference point in the discussion of drinking water quality.

They may briefly be summarized as follows: Turbidity shall not exceed 10 p.p.m.; color—20 p.p.m.; there shall be no odor of hydrogen sulfide, chlorine or other substance; lead shall not exceed 0.1 p.p.m.; copper—0.2 p.p.m.; zinc —5 p.p.m.; sulphate (SO_4)—250 p.p.m.; magnesium—100 p.p.m.; total solids—1000 p.p.m.; chloride—250 p.p.m.; iron—0.3 p.p.m. The water shall contain no caustic alkalinity. The water shall contain a residual alkalinity of at least 10 p.p.m. if it has been treated with an aluminum compound. The carbonates of sodium and potassium shall not exceed 50 p.p.m.

Even though the above cited limits were never a part of the official treasury standard, they are frequently referred to as having official status and should be given early reconsideration.

In terms of their physiological effect upon the water user, it is not certain that the limit for lead is low enough. The limits for zinc and copper appear too low. Some caustic alkalinity is frequently present in municipally softened waters and no ill effects are noted. Residual alum in filtered water is not as unusual as it was thought in 1925. The limits for total solids, chloride, calcium and magnesium are too low, although it is evident that certain highly mineralized waters contain amounts of material in solution disturbing to the person not accustomed to their use. However, considering a standard of quality of water, based only upon dissolved mineral salts and their physiological effect upon the water user, it is evident that our knowledge even now is not adequate enough for hard and fast pronouncements.

When we turn to quality of water as it may affect industrial processes, we are upon more certain grounds in some matters and uncertain grounds in others.

Frequently the volume of water used in an industry makes the control of its quality and amount altogether a problem of the industry itself and not that of the community. The steel industry, when operating at capacity, uses about half as much water per day as is the total of all urban public water supplies in the United States. Your own industry requires major quantities of water although it may control the amount by the degree of re-use of water it practices. As the quality of the product rises from the strawboard up to the fine book and writing papers, so also rises the degree of precision required in the processes, the grade of materials and the quality of the process water. On the other hand, other constituents being unchanged, it is not presumed that borax or fluorine in amounts found in some western waters would affect the paper industry.

But fluorine above 1 part per million appears to produce lasting injury to the tooth structure of children using such water. Borax above 0.75 p.p.m. adversely affects some citrous fruits and borax deficiency adversely affects sugar beet quality.

Hard water as it is found in the Mississippi valley affects certain process industries although it is doubtful whether or not in certain industries, any practicable degree of softening will produce operating results equivalent to those attainable with certain slightly mineralized and very soft waters.

One thing is evident, based upon more than thirty years experience in production of public water supply. Very frequently snap judgment will be taken to the effect that water is responsible for some change in processing results and upon careful investigation it will be found that some other material entering the process has been changed and is affecting the results. Experiences with meat packers, food processors, bakeries, silk stocking weavers and other industries have taught me that careful appraisal of all factors affecting an industrial process is too rarely made.

That in fact leads to the conclusion of this presentation. Standard methods of water analysis and standards of water quality are each means to an end. No water examination laboratory, be it engaged in the production of a public water supply or an industrial supply has any business cluttering up its records and using its time on tests that have not a definitely understood bearing upon the result to be attained.

And standards of water quality should not be set up to include terms or refinements beyond the proportional influence that the water can have on the process or the individual water user. There is for example no point to arguing about 10 or 50 parts per million calcium in a drinking water in so far as its bearing upon the individuals daily calcium need is concerned. The human being needs much more calcium and will obtain it from the normal diet.

There is no point to argument over the 10 or 50 parts of calcium in water if at some step in an industrial process, tons of lime are used. Certainly in setting up standards for water quality there is no point to limits in terms which are not definitely known to affect the process.

Methods must cover the needs and be as exact as the operation demands. Standards must protect the uses and be couched in terms useful to the process in hand. Nothing more—nothing less is reasonable.

Some Colloid Chemical Aspects of Clay As a Loading Material*

By E. A. Hauser[1]

Abstract

A discussion of the colloidal aspects of clays with particular consideration of particle size and shape and base exchange phenomena.

This discourse shall be limited to certain colloidal aspects of clays, those, for instance, which in my opinion are worthwhile for the paper chemist to study in somewhat more detail than has so far been true. I can add with complete confidence that a better understanding of the colloid chemistry of clays, already proven in many other industries, will also help in improving today's methods of using clays in the manufacture of paper.

Rosin Sizing

Had time permitted I should have liked to discuss in a much broader way the increasing importance of colloid chemical reactions in the production of paper. Consider only for a moment the process of rosin sizing of paper, a step undoubtedly familiar to all of you. This is a typical and fascinating colloid problem in your industry. The rosin emulsion as used is made up of an innumerable amount of rosin globules which carry a negative charge on their surface. If the emulsion is placed in an electric field, the particles will migrate to the anode or positive pole. Precipitation will only occur if brought in contact with particles or a surface carrying opposite charge. Now, paper pulp is made up of fibers which are also negatively charged in a watery medium. Therefore, instead of satisfactorily coating the fibers and cementing them together by precipitating the rosin on to the fiber, when mixed, electrical repulsion (due to equal signs) will cause unsatisfactory results.

The addition of alum salt solution or an equivalent completely changes the picture. The positively charged aluminum ions of the dissociated aluminum sulphate solution are deposited on the negatively charged fibers and with their residual positive charges will precipitate the rosin onto their surface. The sulphuric acid resulting from the hydrolysis of the alum neutralizes the OH-ions of the alkali used in saponifying the rosin. This decreases the stability of the emulsion, since the peptizing action of the hydroxyl-ions is destroyed.

$$Al_2(SO_4)_3 + 6\,H_2O \rightleftharpoons 2\,Al(OH)_3 + 3\,H_2SO_4$$

$$2\,Al^{\cdot\cdot\cdot} + 3\,SO_4'' \qquad 3\,SO_4'' + \begin{cases} 6\,H^{\cdot} \\ 6\,OH' \end{cases}$$

One obtains what one may call a kind of a sandwich, the aluminum ions being the spread. This phenomenon is perhaps best described by the term "electro-kinetic cementing" and deserves special attention. It has a far greater bearing on loading problems than one might expect offhand.

Nature of Clays

Clay is a term by no means as definite as is, let us say, the term salt for sodium chloride. Whereas to you, clay means any loading material whose basic chemical composition is a complex aluminum silicate, the soil chemist calls clays "that inorganic fraction of the soil whose particles are less than two micron." For the colloid chemist clay is that fraction whose particles are less than 0.5μ and generally less than 200 millimicron. For many years certain reactions of clays puzzled scientists because they could not be explained by ordinary chemical and physical laws. More recently it has been definitely ascertained that the colloidal fractions of clays are responsible for these phenomena and that these fractions are by far greater than so far had been assumed. Natural clays, when properly treated, yield up to 90 per cent of truly colloidal clay. It is likewise generally overlooked that the natural clays are not pure and homogeneous, the larger particles present in the clay being made up of other mineralogical matter, mainly unchanged feldspar and quartz. After mining the clay and prior to any grinding operation, it is possible to separate these impurities and to obtain a product having particles not over 2μ in size. Air floating, sedimenting or water floating are the most common methods. Further refinements are obtainable by electroosmosis. Any grinding prior to such separation will naturally complicate things because a reduction in particle size of the impurities would immediately make a simple separation more difficult. In certain cases, grinding can also materially change the properties of the clay itself, a matter which I shall discuss later.

Since almost all clays now available for your industry have been purified in one way or another, I can limit my discussion to such products where the larger portion of the particles does not exceed 2μ in size. In the paper in-

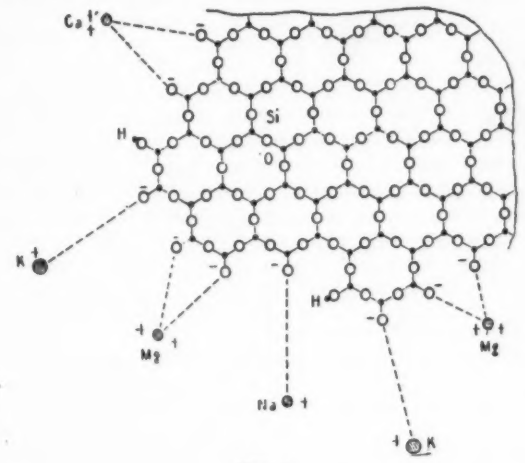

FIG. 1.

Adsorption of exchangeable ions on the edges of Si-O-Plane of a clay crystal (Vertical projection). The fourth valency of the Si-Atom bonds upwards the aluminum-hydroxide plane (not shown). On the crystal surface the Si-O-bonds are cut at the edges. The oxygen atoms, being only bonded with one valency to the Si-plane adsorbs as monovalent negative ions cations from the surrounding liquid. The degree of dissociation is shown by the distances from the oxygen atom. (From Hofmann, Endell and Wilm, Z. Ang. Ch. 47, 539, 1934).

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[1] Massachusetts Institute of Technology, Cambridge, Mass.

dustry the term "clay" mainly refers to aluminum silicate known as koalin and china clay. Both substances have been formed by the gradual disintegration of feldspar due to weathering. The feldspar is decomposed into two typical colloids, namely, silicic acid and aluminum oxide sols, which if in close contact react on each other, forming aluminum-silico-hydrates commonly known as clays.

Particle Size and Shape

Considerable improvements in uniformity in the manufacture of clays with a high percentage of extremely small particles is obtainable by applying adequate desaggregating or deflocculating methods to the purified clay suspension, since the particles present are mainly agglomerates and not primary particles. Only a satisfactorily desaggregated clay will permit the obtaining of uniform results in any application. Most of the properties of clay and its applicability depend on its free exposed surfaces, which are naturally the larger the greater the degree of dispersion. If deflocculation or desaggregation of the clay only occurs in connection with the making up of the paper batch, that means if deflocculation of the dry clay is depended upon in the beater process, then the results must be inconsistent and uncontrollable because we have no means to control complete deflocculation in this way.

Clays, if carefully washed, yield as already mentioned a fraction of stable particles above 2μ in size. However, this fraction is decidedly of sandy character and constitutes the impurities. The remaining lot of the clays is not, contrary to former belief, stable in regard to particle size but continued fractionation (deflocculation) results in a complete dispersion of the aggregates to particle sizes of about 200 millimicrons and less. The lack of intermediate particle size seems to be significant for the true clay mineral. Therefore, it is comprehensible why, with the same type of clay used, the results can materially vary depending on the method of making up the clay suspension or the way the clay is added to the pulp. The addition of deflocculating or dispersing agents to the clay suspension when being made, or to the beater, if the clay is added in dry form, will guarantee the maintenance of a uniform fine distribution. The ideal method would naturally be to run a clay suspension of controlled degree of dispersion, concentration, standardized content of specific electrolytes, etc., into the beater, instead of adding clay aggregates of indefinite size and reactivity in dry form to the pulp.

The shape of the individual clay particles is generally considered to be plate-like in character, although we find a few references in literature that assume that certain clays have rod-shaped particles. I personally feel that the plate shape is prevalent throughout. The paper manufacturer has so far paid but little attention to the geometric configuration of the particle. However, this has some significance, because we have certain indications that plate-like colloidal particles tend to aggregate in chainlike structure, thereby assisting in the building up of a dense, reinforcing structure.

The most important property of clays which at least to my knowledge has so far found insufficient attention in the paper industry is their ability to exchange a certain amount of cations for the cations of electrolytes present in the environment. This exchange capacity known as "base exchange" varies with different clays and runs anywhere from 15 to 100 milliequivalents of exchangeable cations per 100 grams of natural clay. (S=15-100). As previously stated, clays are mainly made up of layers of silica and aluminum oxide bonded together by oxygen. The chemical valencies of the atoms lying in the surface of the colloidal particle are not fully saturated. They become saturated by adsorbing ions out of the surrounding liquids. All kaolinites have exchangeable bases. The main adsorbable cations are: Na, K, Ca, Mg. (Fig. 1). If such a clay is submitted to dialysis or preferably electrodialysis all the cations that are not actually tied into the lattice and fully saturated can be removed and replaced by hydrogen. The latter is again replaceable by other cations resulting in a product exhibiting properties typical for the type of cation now preferentially adsorbed.

Base Exchange Phenomena

If we compare the base exchange of ordinary clays with synthetic permutites as used, for example, in water softening, we find that the base exchange in clays is only about 30 per cent of the former. The reason for the difference is undoubtedly to be found in a somewhat different structure of the two lattices of clay and permutites. Presumably in natural clays the exchange is limited to the ions situated close to the outside surface, whereas in permutites, which have a spongelike lattice structure, the entire interior surface is also accessible. But also under the different types of natural clays we find considerable differences in regard to their base exchange properties. Clays of the "montmorillonite" type (most of the American bentonites belong to this group) presumably permit base exchange to a considerable extent also between the silica and aluminum oxide planes of their structure. (S-100) (Fig. 2). Increased particle fineness as obtained by grinding will therefore alter their base exchange property only to a small extent. However, kaolins which have such a dense structure that their base exchange capacity depends mainly on the atoms of their outer surface will show a material change in properties with increased grinding or desaggregation. (Fig. 3). Permutites and zeolites, where base exchange is a reaction of the inner surfaces will show practically no change on grinding whatsoever.

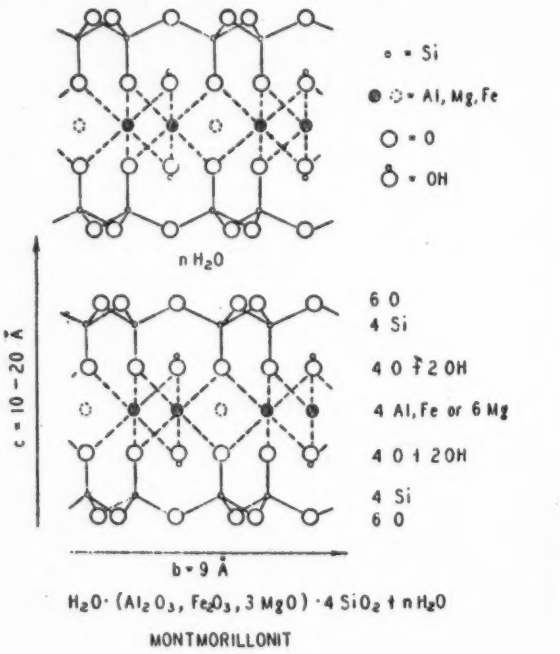

FIG. 2.

Schematic drawing of location of aluminum and silica planes in a montmorillonite crystal, showing spacing between individual parcels. (From Hofmann, Endell and Wilm, Z. ang. Ch. 47, 539, 1934).

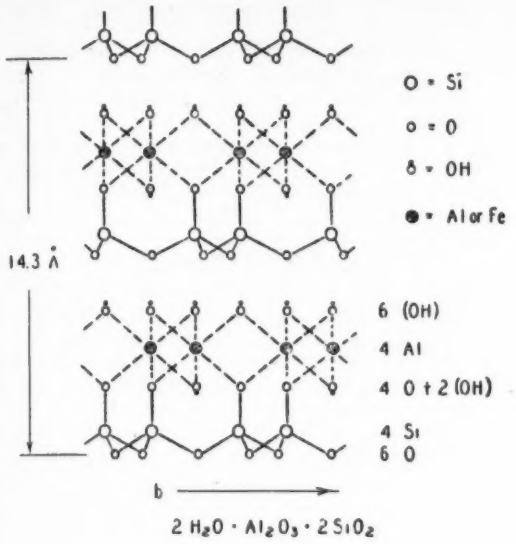

FIG. 3.

Schematic drawing of the plane arrangement in a kaolinite crystal and the distance between the parcels. (From Hofmann, Endell and Wilm, Z. ang. Ch. 47, 539, 1934).

You will realize by now that this base exchange phenomenon can result in clays exhibiting very different properties, depending on their treatment and on the environment. The ideal naturally would be to start with a well-defined clay, for instance, a clay which by electrodialysis or acid washing only carries hydrogen ions (so-called hydrogen or acid clay). By maintaining a perfect control of the concentration and type of electrolyte present in the water when making up the clay suspension and the electrolytes introduced in the further processing a product of absolutely uniform predeterminable behavior could be obtained. Once having definitely established the desired properties, these conditions could be maintained by determining the base exchange capacity of the clay as purchased and adjusting it to the desired effect simply by adding or withdrawing cations from the water used in making up the batch.

Clay as a Loading Material

The use of clay as a loading material has, as I understand, the following purposes: The clay should fill the open meshes of the loose fiber network and decrease the harshness of the fiber, the water absorption of the paper, etc. To obtain this result the clay must be well anchored to the fiber, so that it does not dust out during printing. It is generally agreed that the smaller the particles the better the anchorage. On the other hand, we must realize that a paper pulp that has not been overworked in the beater will result in a fairly open texture. To close this texture it seemed so far logical to advocate the use of fairly large-sized particles. The compromise most generally accepted, therefore, is the application of intermediate particle sizes. Since we have already pointed out that in a properly dispersed and previously purified clay, all particles are very much of the same colloidal size, it seems very likely that the present ideas are based more on the size of aggregates than on the actual individual particle.

The problem therefore should be more that of cementing the fibers together than of merely trying to mechanically fill up the interstices. This clay-cementing will largely depend on the hydration properties of the clay and the latter depends on the structure of the clay crystal and on the type and amount of its exchangeable ions, the latter being mainly responsible for the degree of hydration obtainable.

If we start with a clay that has been separated from its natural impurities, that has been deflocculated or desaggregated to a maximum, and whose exchangeable cations are known, it must be possible to adjust the process in such a way that a clay of the desired degree of hydration is obtained. Such conditioned clay if precipitated onto the fiber by electro-kinetic cementing would not only close the pores satisfactorily but would also exhibit satisfactory anchorage.

In the brief time allotted I hope I have been able to draw your attention to a field of applied colloid chemistry, one that so far has received little recognition, but which should prove as equally beneficial to your industry as it has already to entirely different industrial applications.

Pulp and Paper Industrial Water Specifications*

By H. C. Schwalbe[1]

The sponsors of the Symposium on Water requested the Tappi Preparation of Non-Fibrous Materials Committee to submit a report on water requirements in pulp and paper mills. It is true that the committee is working on the authorized project No. 16 Water Purification, and we have started to collect suitable data through a TAPPI questionnaire and a study of the literature, but it must be stated that the information available up to date is really not at all sufficient for a presentation at a Water Symposium. What we can tell you today will only illustrate the necessity to collect more reliable data and we hope that you will contribute such suggestions as will enable us, at a later date, to give a paper of value. In the following review of water requirements for pulp and paper making, only the processed water as it is used at the place of consumption is discussed. We have not studied boiler water nor did we attempt to evaluate the effect of re-used water (clarified white water).

It is obvious that each branch of the pulp and paper industry requires water of different purity. The finest photographic papers need water of highest purity, while for very coarse, low-priced products water of lower purity is permissible. Our data were not sufficient to determine which degree of purity of water each type of product requires. But we found that for a very large number of mills manufacturing neither high-grade specialties nor very low-priced products, requirements on water purity were rather uniform. Instead of talking in generalities we propose to discuss some definite test figures for such average water, and if you disagree we hope you will let us have your suggestions.

* Presented at the Annual Meeting of the Technical Association of the Pulp and Paper Industry, Waldorf-Astoria Hotel, New York, N. Y.
[1] Member TAPPI, Technical Director, Dill & Collins, Inc., Philadelphia, Pa.

Solids in Water

Water used in pulp and paper mills should be low in *suspended solids.* Turbidity tests as determined according to the Standard Methods of the American Public Health Association and the American Water Works Association should show a test of practically zero to 10 ppm. with an occasional maximum of 25 ppm. Mills producing high grade products require a water of better than 5 ppm. while for low grade papers or pulps 10-25 ppm. is sufficient. A larger amount of suspended solids will affect the brightness of the product and, if retained, can decrease its strength. Small, sharp grained particles may exert an abrasive action on mill equipment such as wires or felts. Other suspended matter can clog up wires or felts or will be carried into the product, thereby causing dirt specks.

Color in Water

It is further well known that water low in color is desirable. "True color" in the sense of water analysis, is due only to substances in solution after suspended matter has been removed. Water with much coloring matter (high in true color) will reduce the brightness and color of pulps or of white and dyed papers since cellulose fibers very readily absorb the coloring substances and remain stained. The organic or iron compounds responsible for the color of water are very difficult to remove from the fibers. Most mills, therefore, agree that mill water should contain no more than 5 to 10 ppm. of color. High grade mills require from practically 0 to 5 ppm., while low grade mills can use water up to 20 ppm. Bad odors of water are mostly objectionable, but we cannot give you any definite data about permissible limits. The temperature of water was formerly considered very important and uniformly cool water throughout the year was desired. High temperature of the water will affect sizing of paper and similar processes. On the other hand, water of, for example, 90 deg. F. will permit easier drainage on the wet end of paper machines and will affect washing operations.

Water analyses normally contain data on total dissolved matter, volatile and fixed matter. These tests are indicative of the general water quality, but do not define its suitability for pulp or paper. In regard to total dissolved matter the mills answering the questionnaire reported 21 to 200 ppm. Klemm stated that 300 to 500 ppm. were tolerable. This seems to be rather high as, on consultation with several mill chemists, it was found that an average of 75 ppm. would be sufficient for finer papers and 150 ppm. for coarser products.

Volatile Matter

The data given for volatile matter varied from 20 to 180 ppm. This figure is only indicative and should be analyzed for ignition loss due to carbonate, nitrates and for organic matter. Water high in organic matter can be harmful if sterilization is not successful to prevent growth of bacteria and algae. Griffin *(1)* review the bad effects of slime bacteria causing slime spots, pin holes and certain stock lumps with a slime bacteria center. If organic matter is due to residual humus matter with correspondingly poor color of the water, it will affect the bleaching of pulps and as Opfermann *(2)* points out will increase chlorine consumption and make washing more difficult.

To overcome slime growth a residual chlorine content of 0.3 ppm. is recommended, but certain mills find it advisable to carry up to 0.8 ppm. if chloramines are used.

The potassium permanganate figure or oxygen consumed, indicating the oxidizable organic material, if corrected for ferrous iron, nitrite, iron and sulphides (See Sutermeister) *(3)* should be, according to Opfermann *(2)* not higher than 20 ppm.

Water Hardness

The fixed or mineral matter varying in our reports from 43 to 139 ppm. is again only an indication. If calcium and magnesium salts are present, forming high hardness, the water may affect the washing of sulphite or similar pulp by a deposition of calcium resinate according to Sutermeister *(4)*. In the soda process the lime salts may be precipitated as carbonate or sulphate and carry down coloring matter, making bleaching more difficult as stated by Beveridge *(5)*. High hardness may increase the ash content of rayon or other special pulps *(2)*. Water which is very hard will cause sizing difficulties. But otherwise hard water is rarely a serious objection. Opfermann set as a limit a hardness figure of 180 ppm., while several other chemists suggested for fine papers an optimum of 100 ppm. Silica, if present in larger amounts, can be objectionable. Gesell *(6)* reported that silica made paper undesirably "hard and tinny."

Chlorides are mostly harmless in paper making. Only in the case of sizing of paper as Sieber *(7)* found was an amount of 60 ppm. sufficient to cause serious trouble.

Iron and Manganese Content

The iron content is important as it causes discoloration of pulp and paper. Opfermann states that iron will cause yellowing if it combines with incrustants of pulps or with resins and pitch. Gesell *(6)* reports that iron can act as catalyst to oxidize cellulose and may interfere with sizing, resulting in uneven and light sensitive sized paper. It may also interfere with the coloring of paper. In the case of iron, and also in all other qualities of water, it is important to determine the purity of water at its place of consumption. To give an example, water after filtration had an iron content of 0.03 ppm., in the far end of the mill it had 0.18 ppm. and hot water from a poor heater, which was actually used for a washing process, had 1.05 ppm. iron as Fe. The mills reporting in the questionnaire suggest a standard of 0.05 to 0.1 ppm. and a maximum of 0.2 ppm. For the production of photographic paper 0.1 ppm. is already too much. Very undesirable is growth of iron bacteria which are described in detail by Gesell. They can be eliminated by chlorination and the specification for residual chlorine should be sufficient as far as we know today. Very similar to iron is manganese, which is harmful in paper making, due to discoloration of fibers. Gesell reports that it is also very detrimental to the stability of rosin size and that an amount of 2 ppm. retarded the drainage of pulp in drainers very much. Gesell states that manganese dioxide in the absence of acid reaction is an adhesive and forms with calcium chloride left over from the bleach applied, a cementing substance which clogs drain holes. The amounts of manganese reported vary from 0.07 ppm. to 0.123 ppm. Opfermann states that the limit should be 0.05 ppm.

Carbon Dioxide and pH

The effect of carbon dioxide has been investigated in recent years more than previously. It was stated that if the CO_2 content of water exceeds 25 ppm. it may seriously affect sheet formation on a paper machine. A limit of 10 ppm. is recommended.

The hydrogen ion concentration of mill water should always be controlled. To reduce corrosion of pipes a pH of 7.0-7.3 is recommended, but our study showed that many mills work with a pH of 6.7 to 7.0. One case is known where water with a pH of 8.3 caused sizing and pitch trouble. Summarizing the information we possess to date the following very tentative specification for pulp

and paper mill water for an average mill is given as a basis for discussion.

	Proposed Standard	Permissible Tolerance for Lower Grade Products
Turbidity	5 ppm.	25 ppm.
Color	5	15
pH	7.0	6.7-7.3
Residual chlorine	0.3 ppm.	0.8 ppm.
Total dissolved solids	75 ppm.	150 ppm.
Mineral solids	80 ppm.	200 ppm.
Hardness	Up to 100 ppm.	200 ppm.
Potassium permanganate test	10 ppm.	20 ppm.
Iron as Fe	0.05 to 0.1 ppm.	0.2 ppm.
Manganese as Mn	0.05 ppm.	0.1 ppm.

In conclusion it should be emphasized again that we need more information before we will be able to describe the water requirements of the pulp and paper industry adequately.

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Lacquered Papers*

By Walter D. Bowlby[1]

Many of us have been hearing a good deal about lacquered papers. It therefore seems appropriate at this time to present a general summary of the art.

Man-made lacquer was discovered by a French professor working in the past century. It has been in demand during the last fifteen years. Although a mere youngster alongside paper it has attained a prominent place as evidenced by the hundreds of manufacturers and the thousands of formulas. Every day of late an endless parade of newly discovered modifying ingredients passes out of research laboratories and into plant workshops. Truly, the dawn of lacquers has just begun.

The vital ingredient of the majority of lacquers is cellulose nitrate which will undoubtedly remain the most widely used base material. Forty odd distinct types are available. Compounding it into a coating composition requires modification with any or several of the hundreds of softening and film-building substances known as plasticizers and resins. It is then dissolved in volatile organic solvents to give the desired concentration and viscosity in view of the particular problem at hand.

France was the birthplace of nitrocellulose lacquered paper. Inertia against its expansion was overcome by the recent development in this country of low viscosity grades of cellulose nitrate. Before this field can enjoy a prominent place in modern industry it needs a lower cost for lacquer. Such may readily be expected as a result of the ever increasing volume of this trade.

Lacquer Patents

The rapid stride of lacquered papers is best observed in the patent literature. Some two hundred and fifty United States patents cover the field. Three-quarters of them are less than seventeen years old; one half less than five years with only one quarter of them of special interest. No one inventor controls more than five per cent and no assignee more than ten per cent. The art is obviously young, active and diversified.

Old disclosures cover waterproof, bronze and high-gloss papers. Recent suggestions are oilproof, grease-resistant and crystal papers. The number of patents pertinent to different types of lacquered papers is as follows: forty—waterproof, twenty-six—moistureproof, fourteen—transparent, eleven—bronze, ten—high gloss, nine—greaseproof, six—crystal and two—imitation cellophane.

Various types of paper are suggested for lacquering as: abrasive, advertising matter, blotters, board, bottles, card, cigarette, coverings for shelf, floor, roof, book and furniture, enamel, foil, glassine, insulating, laminations, money, parchment, sound records, tape, transfers and the like.

At one time or another thirty-five companies have advertised lacquered papers. Many development men in both fields are anxious to cooperate in mutual experiments in the necessary time for getting one another on the proper problems remains the biggest obstacle facing a more rapid expansion of the art. Right now producers of bronze, crystal, high-gloss and transparent papers enjoy a good business founded upon many months of careful and timely experiments.

Safety in Use of Lacquers

Do not shut your mind to the improvements lacquer offers because of hearsay fire hazards. False opinions on this subject are still too common. Whatever danger there is results only in the use of inflammable and volatile solvents. Of course, good advice should be had before handling large quantities of lacquer yet fear is unnecessary. No trouble has been experienced during the last five years in the lacquering of tons of glassine and cellophane. It seems fair to state that the process is not practically more dangerous than spirit varnishing, solvent sizing or solvent extraction. At the same time it must be understood that alcohol as well as lacquer solvents form potentially explosive mixtures with air when confined and ignited in concentrations of from one to twenty percent by volume. Such ignition may be caused by flames or static sparks. Heat as used in paper processes is not enough in itself to set off the mixture. The logical way to operate a drying chamber is at low concentration of solvent vapor. Five thousand cubic feet of air per gallon of lacquer is a reasonable figure. Excess air affords safety as well as odorless coated stock. The minimum possible amount of lacquer should be exposed at any one time. The operating room should be well ventilated at top and bottom. Heat may be safely furnished by internal steam coils or by the better method of external gas or oil forced-draft heating units. The recovery of evaporated solvents is practical only on steady and extensive production schedules. It plays little part in the average procedure of lacquering paper.

Requirements of Lacquers and Paper

When it comes to getting a satisfactory lacquer job done, it is necessary to exercise care in the selection of the paper, lacquer and method of application.

All paper should be clean, as dust and fuzz easily accumulate in the lacquer applicator and cause defects in the

* Presented at the Annual Meeting of the Technical Association of the Pulp and Paper Industry, Waldorf-Astoria Hotel, New York, N. Y., Feb. 22-25, 1937.

[1] Member TAPPI, Allentown, Pa.

coated surface. A dense and smooth surface makes for an economical and satisfactory job. Often base coats are used, comprising of starch, glue or casein. Smoothness is essential since a lacquer film takes on the characteristics of its support. Paper should also be non-curling, flexible and uniform in thickness. In general a good varnish stock is a fair lacquer paper. Special problems may require the impregnation or surface coating of porous stocks.

Satisfactory Lacquer Is Odorless

Satisfactory lacquer is odorless, fast drying, non-toxic, smooth, properly balanced in viscosity and solid content and of the desired appearance. Formulas may be had that dry in one half minute at room temperature or in one second at 160 deg. Special effects in the lacquer film are obtained by use of dyes, waxes, pigments, crystals, metal powders as well as crackle, wrinkle or flattening agents. In general a good paper lacquer comprises nitrocellulose simply modified and dissolved in a minimum amount of solvents.

The coating device may be one of several types, spray, dip, knife, brush, flush, roll, print or transfer. Roller coating is generally adopted, newly developed reverse steel roll machines being preferred. Irregular rigid paper stocks may be coated on rubber roll devices. A machine handling the maximum viscosity lacquer is the most economical. Thickness of the coating to be applied depends largely upon the requirements of the problem. It may range from five hundred thousandths to several thousandths of an inch. Label work requires a dried film substantially 0.004 inch thick. In other words, a gallon of lacquer may be expected to cover from three hundred to four thousand square feet of paper surface. One coat applications are in general use. The rate and method of drying is also varied to meet the particular problem or location.

Advantages of Lacquer

Lacquered labels, packages and wraps are fast becoming popular. Advantages of lacquer are best set off when applied to round containers printed in vivid colors on extra smooth paper. Such products, pleasing to the eyes and hands resemble cellophane wrapped goods both in appearance and protective qualities at a saving in time, trouble and money. The Life Saver candy is now wrapped in such a package.

Aniline Machines and Their Uses*

By J. B. Shaughnessy[1]

There are many makes of aniline printing machines on the market. Some are sturdier than others, some are more flexible than others, each intended for its particular use, from small bag printing through paper decorating and board printing for the most part from web.

Constantly Increasing Demand

The demand for papers with designs, trade-marks, decorations or plain staining, in the box, papeterie, fancy finish, offset, wrapper, greeting card field, etc., is great and constantly increasing. Paper manufacturers are finding an ever increasing demand in the market for papers having a good appearance, costing less and yet being effective. Aniline machines of domestic and foreign manufacture are available and paper manufacturers and converters can today have the utmost confidence in them. Pioneering work along this line has been done by comparatively few manufacturers in conjunction with ink and dyestuff houses as well as rubber design roll makers. The machines themselves have been simplified and are no longer a mystery or in any way complicated. One of the big objections to the aniline machine and aniline staining or printing was that the inks were fugitive and therefore were limited to use on those papers only that would not come in contact with direct sunlight.

Ink and dyestuff manufacturers today have a product which is no longer a true aniline ink and therefore less fugitive, and is called a fluid ink, still water-like, and having the same general characteristics as aniline ink, but pigmented to give opacity. In many instances lacquer is being used.

It follows, therefore, that it is possible for a manufacturer to change a brand name, order his wrapping paper, and ship goods under the new brand name in the same season. Greeting card manufacturers can include last minute designs in current line. Corrugated box manufacturers are printing over-all designs or trade-marks on the liner, after which, the paper is corrugated and comes from the combiner sheeted ready for feeding into their presses to over-print the name and quantity of the particular item to go into the container.

Staining of papers with rubber rolls and fluid inks is also an all-important feature. Small quantities of paper can be printed extremely well on an aniline machine. This method permits the mill to run and carry in stock a white and unbleached stock and to match any color on short notice running only the exact amount of paper required. Two-tone sheets can be produced in a similar manner.

Will Become Part of Paper Machine

I firmly believe that the day is not far off when the aniline machine will be attached to, or become a part of, the paper machine. That is to say it will be built right into the machine and used when necessary. Drying is practically instantaneous and the printability of the paper not affected. I might add here that rubber rolls are being considered for imprinting of designs into paper at the wet end of the paper machine, either depending solely on impression or, utilizing a simple inking attachment which would put a design or trade-mark into the sheet and have it finished fairly smooth and yet remain apparent without having any shearing action on the fibers. The most practical location for these design rolls seems to be in doubt or let us say has not yet been finally decided upon. The aforementioned application would seem to me to be the first step toward the embodying of an aniline printing unit in the paper machine.

* Presented at the Annual Meeting of the Technical Association of the Pulp and Paper Industry, Waldorf-Astoria Hotel, New York, N. Y., Feb. 22-25, 1937.

[1] Manager, Rubber Printing Products Div., American Wringer Company, Woonsocket, R. I.

Imports of Paper and Paper Stock

Giving Manifests of New York, Boston, Philadelphia and Other Ports, of Newsprint, Wrapping, Writing, Coated, Blotting, Tissue, Strawboard, Wallboard, Cigarette Papers, Sulphite, Kraft and Ground Wood Pulp.

NEW YORK IMPORTS

WEEK ENDING AUGUST 7, 1937

SUMMARY

Cigarette paper	298 cs.
Wall paper	8 cs.
Wall board	7516 bdls.
Paper hangings	6 bls., 1 cs.
Newsprint	10,836 rolls
Printing paper	51 cs.
Wrapping paper	58 cs., 145 rolls
Drawing paper	8 cs.
Filter paper	23 cs.
Filter mass	9 bls.
Surface coated paper	36 cs.
Metal coated paper	37 cs.
Decalcomania paper	28 drums, 5 cs. (*duplex*)
Decalcomanias	20 cs.
Transfer pictures	14 cs.
Colored paper	8 cs.
Paper tubes	97 pkgs.
Miscellaneous paper	28 cs.

CIGARETTE PAPER

H. H. Strauss, *Normandie,* Havre, 221 cs.
De Manduit Paper Corp., *Normandie,* Havre, 2 cs.
Braunstein Freres, Inc., *Normandie,* Havre, 75 cs.

WALL PAPER

———, *Aquitania,* Southampton, 1 cs.
———, *Deutschland,* Bremen, 3 cs.
———, *Manhattan,* Havre, 4 cs.

WALL BOARD

Treetex Corp., *Vungaren,* Gefle, 3805 bdls.
Treetex Corp., *Minnequa,* Horneborg, 3675 bdls.
———, *Minnequa,* Sundsvall, 36 bdls.

PAPER HANGINGS

W. H. S. Lloyd & Co., *Georgic,* London, 6 bdls., 1 cs.

NEWSPRINT

International Paper Co., *Chr. Sass,* Dalhousie, 2675 rolls.
International Paper Sales Co., *Chr. Sass,* Dalhousie, 3108 rolls.
N. Y. Evening Journal, *Markland,* Liverpool, N. S., 502 rolls.
N. Y. Tribune, *Markland,* Liverpool, N. S., 1648 rolls.
World Telegram, *Markland,* Liverpool, N. S., 603 rolls.
Brooklyn Daily Eagle, *Markland,* Liverpool, N. S., 353 rolls.
Westchester Newspapers, Inc., *Markland,* Liverpool, N. S., 53 rolls.
Parsons & Whittemore, Inc., *Markland,* Liverpool, N. S., 164 rolls.
International Paper Co., *G. T. D.,* Gatineau, 304 rolls.
International Paper Co., *International No. 1,* Gatineau, 310 rolls.
Jay Madden Corp., *Manhattan,* Hamburg, 354 rolls.
Jay Madden Corp., *Deutschland,* Bremen, 346 rolls.
Jay Madden Corp., *Deutschland,* Hamburg, 179 rolls.
Perkins Goodwin & Co., *Deutschland,* Hamburg, 237 rolls.

PRINTING PAPER

E. Dietzgen & Co., *Fratevale,* Marseilles, 8 cs.
S. Bienfang, *Fratevale,* Marseilles, 7 cs.
L. A. Consmiller, *Bremen,* Bremen, 25 cs.
Senefelder Co., Inc., *Deutschland,* Hamburg, 11 cs.

WRAPPING PAPER

Keller Dorian Paper Co., *Exochorda,* Marseilles, 13 cs.
Steiner Paper Corp., *Deutschland,* Hamburg, 8 cs.
———, *Deutschland,* Hamburg, 37 cs.
Blauvelt Wiley Paper Manfg. Co., *Deutschland,* Hamburg, 53 rolls.
Guaranty Trust Co., *Deutschland,* Hamburg, 92 rolls.

DRAWING PAPER

H. Reeve Angel & Co., Inc., *Georgic,* London, 8 cs.

FILTER PAPER

H. Reeve Angel & Co., Inc., *Georgic,* London, 13 cs.
H. Reeve Angel & Co., Inc., *Aquitania,* Southampton, 10 cs.

FILTER MASS

F. Aufrecht, *Deutschland,* Hamburg, 9 bls.

SURFACE COATED PAPER

Gevaert Co. of America, *Pennland,* Antwerp, 30 cs.
J. J. Gavin, *Deutschland,* Hamburg, 6 cs.

METAL COATED PAPER

K. Pauli Co., *Deutschland,* Bremen, 37 cs.

DECALCOMANIA PAPER

B. F. Drakenfeld & Co., *Samaria,* Liverpool, 28 drums, 5 cs. (duplex).

DECALCOMANIAS

Sellers Transportation Co., *Bremen,* Bremen, 20 cs.

TRANSFER PICTURES

Rohner Gehrig & Co., *Bremen,* Bremen, 14 cs.

COLORED PAPER

International F'd'g Co., *Deutschland,* Hamburg, 8 cs.

PAPER TUBES

———, *Deutschland,* Bremen, 97 pkgs.

MISCELLANEOUS PAPER

Coty Processing Co., *Normandie,* Havre, 13 cs.
Japan Paper Co., *Rex,* Genoa, 15 cs.

RAGS, BAGGINGS, ETC.

———, *Bajamar,* London, 10 bls. rags, 76 bls. old strings.
Chase National Bank, *Bajamar,* London, 20 bls. paperstock.
A. H. Searle, *Bajamar,* London, 82 bls. rags.
Philadelphia National Bank, *Pennland,* Antwerp, 72 bls. rags.
———, *Sarcoxie,* Dunkirk, 19 bls. rags.
E. J. Keller Co., Inc., *Black Heron,* ———, 104 bls. bagging.
Castle & Overton, Inc., *Black Heron,* Rotterdam, 59 bls. rags, 64 bls. bagging.
Great Eastern Packing & Paperstock Corp., *Black Heron,* Rotterdam, 329 bls. picker waste.
Van Oppen & Co., *Black Heron,* Antwerp, 47 bls. rags, 66 bls. bagging.
E. J. Keller Co., Inc., *Exochorda,* ———, 276 bls. bagging, 432 bls. rags.
R. J. Ross & Co., Inc., *Exochorda,* Alexandria, 370 bls. bagging.
Hicks Costarino & Co., Inc., *Exochorda,* Alexandria, 221 bls. rags.
Keene, Inc., *Exochorda,* Alexandria, 146 bls. old cottons, 86 bls. bagging.

———, *Exochorda,* Alexandria, 382 bls. rags.
R. Blank, *Exochorda,* Alexandria, 123 bls. old cottons, 79 bls. rags.
W. Steck & Co., *Exochorda,* Alexandria, 73 bls. rags.
E. Mayer, *Exochorda,* Alexandria, 11 bls. rags.
W. Steck & Co., *Indep. Hall,* Dunkirk, 81 bls. old strings.
D. Benedetto, Inc., *Indep. Hall,* Dunkirk, 32 bls. rags.
Banco Coml Italiane Trust Co., *Deutschland,* Hamburg, 269 bls. rags.
Hughes Fawcett, Inc., *Manhattan,* Hamburg, 11 bls. flax waste.

OLD ROPE

International Purchasing Co., *Trentino,* Hull, 63 coils.
Manufacturers Trust Co., *Bajamar,* London, 55 coils.
Banco Coml Italiane Trust Co., *Bajamar,* London, 46 coils.

WOOD PULP

M. Sone, *Vingaren,* Sundsvall, 1800 bls. wood pulp.
Price & Pierce, Ltd., *Vingaren,* Gefle, 300 bls. unbleached sulphate; 1200 bls. unbleached sulphite.
E. M. Sergeant Pulp & Chemical Co., *Vingaren,* Gefle, 450 bls. sulphate, 1200 bls. sulphite.
Bank of N. Y. Trust Co., *Vingaren,* Gefle, 900 bls. sulphite.
Gottesman & Co., Inc., *Vingaren,* Gefle, 4950 bls. kraft pulp, 500 bls. sulphite, 2500 bls. sulphate.
Price & Pierce, Ltd., *Minnequa,* Sweden, 306 bls. unbleached sulphite.
Lagerloef Trading Co., *Minnequa,* Kemi, 1700 bls. sulphate, 282 tons; 2435 bls. sulphite, 409 tons.
Brown Bros. Harriman & Co., *Minnequa,* Kopmanholmen, 2106 bls. chemical pulp, 350 tons.
Mead Sales Co., Inc., *Minnequa,* Sundsvall, 210 bls. chemical pulp, 42 tons.
Johaneson Wales & Sparre, Inc., *Minnequa,* Sundsvall, 200 bls. chemical pulp, 40 tons; 300 bls. sulphite, 50 tons.
Bulkley Dunton Pulp Co., Inc., *Minnequa,* ———, 4050 bls. sulphite, 675 tons.
A. Giese & Son, *Veendam,* Rotterdam, 40 bls. wood pulp.
———, *Deutschland,* Hamburg, 842 bls. wood pulp, 126 tons.
Castle & Overton, Inc., *Deutschland,* Hamburg, 1390 bls. wood pulp, 278 tons.
Bank of N. Y. Trust Co., *Deutschland,* Hamburg, 555 bls. wood pulp, 111 tons.
M. Sone, *Hansa,* Hamburg, 392 bls. wood pulp, 53 tons.

WOOD PULP BOARDS

Rohner Gehrig & Co., *Bremen,* Bremen, 14 cs.
Flexideal Dry Mat Co., *Manhattan,* Hamburg, 85 bls., 11 cs.

NEWARK IMPORTS

WEEK ENDING AUGUST 7, 1937

H. G. Craig Co., *Newscarrier,* Donnacona, 314 rolls newsprint.
H. G. Craig Co., *Donpaco,* Donnacona, 321 rolls newsprint.
H. G. Craig Co., *Kermic,* Donnacona, 299 rolls newsprint.

ALBANY IMPORTS

WEEK ENDING AUGUST 7, 1937

Pagel Horton & Co., Inc., *Milos,* Gefle, 10250 bls. sulphite, 1150 tons; 1750 bls. sulphate, 350 tons.
———, *Milos,* Gefle, 375 bls. sulphite, 75 tons.
———, *Milos,* Iggesund, 2125 bls. sulphite, 424 tons.
National City Bank, *Milos,* Iggesund, 1600 bls. sulphite, 200 tons.
Pagel Horton & Co., Inc., *Milos,* Sikea, 3750 bls. sulphite, 625 tons.
Tradesmans Natl Bank Trust Co., *Milos,* Norrsundet, 5735 bls. sulphate, 1262 tons.
Price & Pierce, Ltd., *Delaware,* ———, 2000 bls. bleached sulphite; 900 bls. unbleached sulphite.

BOSTON IMPORTS

WEEK ENDING AUGUST 7, 1937

Lagerloef Trading Co., *Minnequa,* Kemi, 4502 bls. sulphate, 750 tons; 1075 bls. sulphite, 180 tons.
Treetex Corp., *Minnequa,* Horneborg, 542 bdls. wall board.
———, *Minnequa,* Sundsvall, 2064 bdls. wall board.
———, *Sarcoxie,* Havre, 130 bls. bagging.
———, *Sarcoxie,* Dunkirk, 35 bls. rags.
Irving Trust Co., *Sarcoxie,* Dunkirk, 71 bls. bagging.

PHILADELPHIA IMPORTS

WEEK ENDING JULY 31, 1937

Neidich Process Co., *Scanpenn,* Helsingfors, 93 bbls., 2 cs paper.
Lagerloef Trading Co., *Scanpenn,* Wiborg, 1,215 bls. sulphite, 235 tons.
Lagerloef Trading Co., *Scanpenn,* Wiborg, 129 bls. sulphate, 25 tons.
Lagerloef Trading Co., *Scanpenn,* Kotka, 150 bls. sulphate, 30 tons.
Lagerloef Trading Co., *Scanpenn,* Kotka, 1,040 bls. mechanical pulp, 208 tons.
J. W. Hampton Jr. Co., *Scanpenn,* Kotka, 396 rolls newsprint.
M. Sone, *Frankenwald,* Hamburg, 750 bls. wood pulp.
Pagel Horton & Co. Inc., *Southfolk,* Sweden, 6,000 bls. wood pulp.

WEEK ENDING AUGUST 7, 1937

C. W. Speidel Co., *Gretavale,* Marseilles, 10 cs. printing paper.
Stora Kopparberg Corp., *Vingaren,* Sweden, 266 bls. dry pulp.
———, *Vingaren,* Sweden, 850 bls. sulphite.
Gottesman & Co., Inc., *Vingaren,* Sweden, 5425 bls. sulphite, 750 bls. sulphate, 3000 bls. kraft pulp.
Price & Pierce, Ltd., *Minnequa,* Orviken, 3000 bls. unbleached sulphite, 500 tons.
Castle & Overton, Inc., *Black Heron,* Rotterdam, 108 bls. rags.
E. J. Keller Co., Inc., *Black Heron,* ———, 81 bls. paper stock.
Gottesman & Co., Inc., *Uddeholm,* Sweden, 920 bls. wood pulp.

BALTIMORE IMPORTS

WEEK ENDING JULY 31, 1937

Congoleum Nairn Co., *Schodack,* Havre, 627 bls. rags.
Congoleum Nairn Co., *Schodack,* Bordeaux, 78 bls. rags.
Loumar Textile By Products, *Schodack,* Bordeaux, 32 bls. rags.
E. J. Keller Co. Inc., *Schodack,* ———, 751 bls. rags.
———, *Clara,* Triest, 972 bls. wood pulp.
M. Sone, *Clara,* Triest, 318 bls. wood pulp.
Stora Kopparberg Corp., *Innaren,* Skutskar, 3,745 bls. dry pulp.
Pagel Horton & Co. Inc., *Innaren,* Gefle, 1,750 bls. sulphite.
Pagel Horton & Co. Inc., *Innaren,* Gefle, 1,250 bls. sulphate.
Tradesmans National Bank Trust Co., *Innaren,* Gefle, 250 bls. sulphate.
———, *Innaren,* Gefle, 925 bls. sulphite.
Price & Pierce, Ltd., *Innaren,* Ljusne, 1,698 bls. sulphite.
Price & Pierce, Ltd., *Innaren,* Ljusne, 2,610 bls. sulphate.
Gottesman & Co. Inc., *Innaren,* Hudiksvall, 1,325 bls. sulphate.
Pagel Horton & Co. Inc., *Innaren,* Sundsvall, 1,500 bls. sulphate.
Bulkley Dunton Pulp Co. Inc., *Innaren,* ———, 375 bls. sulphite.
Bulkley Dunton Pulp Co. Inc., *Innaren,* ———, 1,750 bls. sulphate.
M. Sone, *City of Havre,* Hamburg, 4,510 bls. wood pulp, 809 tons.
Parsons & Whittemore, Inc., *City of Havre.* ———, 193 bls. wood pulp.

WEEK ENDING AUGUST 7, 1937

———, *Black Heron,* Rotterdam, 541 bls. wood pulp, 107 tons.
W. Steck & Co., *Black Heron,* Rotterdam, 40 bls. old rope.
M. Sone, *City of Baltimore,* Hamburg, 1259 bls. wood pupl.

SOUTH HAVEN IMPORTS

WEEK ENDING AUGUST 7, 1937

Gottesman & Co., Inc., *Vigor,* Sweden, 1875 bls. wood pulp.

WILMINGTON IMPORTS

WEEK ENDING JULY 31, 1937

Lagerloef Trading Co., *Scanmail,* Kotka, 2,480 bls. sulphite, 421 tons.
Castle & Overton, Inc., *Scanmail,* Wiborg, 5,510 bls. wood pulp, 1,102 tons.

DO YOU KNOW..

IT COSTS MORE TO REPACK A PUMP THAN THE PRICE OF THE PACKING ITSELF

Experience has shown that the labor charge, the time wasted, the stoppage of production, far outweigh the actual cost of the packing.

TO SOLVE THIS PROBLEM WE OFFER

CUTNO PACKING

FOR PUMPS HANDLING CAUSTIC SODA

IT WITHSTANDS THE WASHING-OUT TENDENCY OF CAUSTIC AND SIMILAR ALKALIS BECAUSE IT CARRIES A LUBRICATING COMPOUND TO RESIST THESE LIQUIDS.

GREENE, TWEED & CO.

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Send for free working sample for test. State size of packing used.

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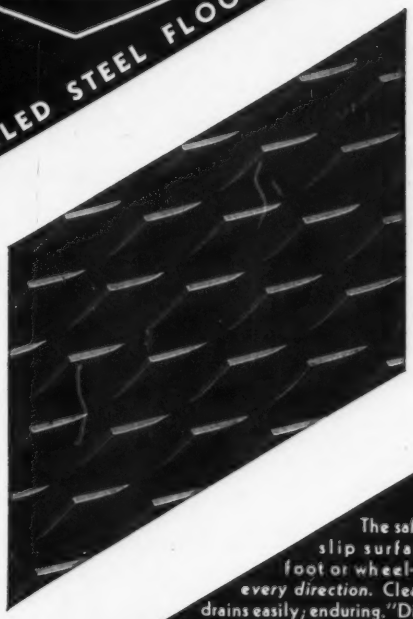
ROLLED STEEL FLOOR PLATE



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Write for sample and literature.

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Sinclair DOUBLE TRUSS DANDY ROLLS Mounted in the **Sinclair Single Pedestal Stand**

is the last word in an Open End Dandy Roll Application

THE SINCLAIR COMPANY

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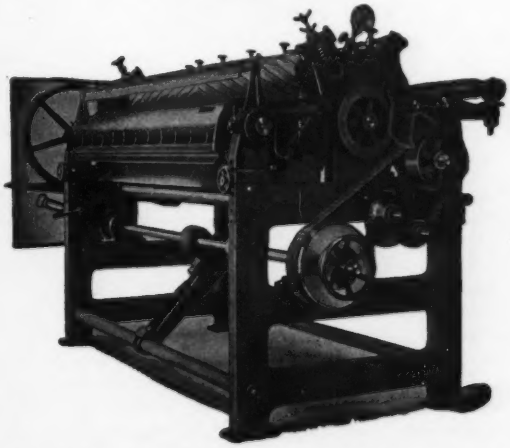
FOURDRINIER WIRES · CYLINDER WIRES · DANDY ROLLS · CYLINDER MOULDS

MODEL 28

ROLLER BEARING CUTTER



HAMBLET MACHINE CO.

LAWRENCE, MASS.

MAKERS OF

SINGLE, DUPLEX AND DIAGONAL PAPER CUTTERS. CUTTER KNIVES, PATENT TOP SLITTERS.

NORFOLK IMPORTS

WEEK ENDING JULY 31, 1937

Castle & Overton, Inc., *Scanpenn*, Wiborg, 2,126 bls. wood pulp, 421 tons.
Lagerloef Trading Co., *Scanpenn*, Wiborg, 2,855 bls. sulphate, 541 tons.
Lagerloef Trading Co., *Scanpenn*, Wiborg, 564 bls. sulphate, 94 tons.
Jay Madden Corp., *Scanpenn*, Kotka, 237 rolls wood pulp boards, 67 tons.
Lagerloef Trading Co., *Scanpenn*, Kotka, 3,705 bls. mechanical pulp, 741 tons.

NEWPORT NEWS IMPORTS

WEEK ENDING JULY 31, 1937

Pagel Horton & Co. Inc., *Slemmestad*, Sweden, 3,000 bls. wood pulp.

NEW ORLEANS IMPORTS

WEEK ENDING JULY 31, 1937

Parsons & Whittemore, Inc., *Frankenwald*, ——, 933 bls. wood pulp.

MONTREAL IMPORTS

WEEK ENDING JULY 31, 1937

Price & Pierce, Ltd., *Blankaholm*, ——, 3,000 bls. unbleached sulphite.
Gottesman & Co. Inc., *Blankaholm*, Sweden, 22,300 bls. wood pulp.

To Make Bleached Sulphite

The pulp mill now under construction at Fernandina, Florida, by the Fernandina Pulp and Paper Company, will be a bleached sulphite mill, being the first plant of commercial size designed for the manufacture of pulp from Southern woods by use of the sulphite process.

Fernandina Pulp and Paper Company is a wholly owned subsidiary of Rainier Pulp and Paper Company. The latter company is one of the world's largest producers of highly refined sulphite pulp sold for use in the manufacture of rayon yarn, cellophane, staple fiber and other cellulose products, with mills located at Shelton and Tacoma, Wash. Rainier Pulp and Paper Company also supervises the manufacture and sale of dissolving pulps produced by Grays Harbor Pulp and Paper Company and Olympic Forest Products Company with mills located at Hoquiam and Port Angeles, Wash., respectively.

Rainier Pulp and Paper Company's engineering staff have designed and will supervise the construction of the Fernandina plant.

Color and Legibility

References to information on the relation of color and legibility are contained in National Bureau of Standards Letter Circular 351.

One investigator has found that black type on yellow background is the most legible combination and lists other combinations in decreasing order of legibility as follows: green on white; red on white; blue on white; black on white; red on yellow; green on red; red on green. Relative to speed of reading, however, other investigators have found that black on white background can be read most speedily, and give other combinations in the following order of decreasing speediness; green on white; blue on white; black on yellow; red on yellow; red on white; green on red; red on green.

References to published information developed at the Bureau on the legibility of automobile license plates and road signs, and on marking obstructions to air navigation are included.

Czechoslovakian Paper Output Gains

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., August 9, 1937—Production and sales of pulp and paper by the Czechoslovakian mills are well ahead of the corresponding period last year, according to a report from American Vice Consul Andrew Gilchrist at Prague. Production of paper exclusive of newsprint amounted to 20,870 metric tons, representing an increase of 26 per cent over the output during April 1936, and bringing the total for the first four months of the current year up to 77,290 metric tons as against 65,550 tons during the corresponding period of 1936. Incidentally, it might be mentioned that the present rate of production in the Czechoslovakian mills is the highest during the past five years.

Production of newsprint paper during April is estimated at 4,177 metric tons, compared with 3,307 tons during April 1936.

Production of sulphite pulp in April is reported by the cartel at 14,000 metric tons, and ground pulp at 370 tons.

The paper cartel increased prices May 7 on all classes of paper. Quotations on graphic papers were increased by 6 to 7 per cent, on wrappings by 7 to 10 per cent, and on "wood free" papers by 6 per cent. Most of the increases did not affect the April prices, although a few were retroactive for all orders received 14 days prior to May 7.

Paper Directory of All Nations Out

The Paper Makers' Directory of All Nations for 1937 published by Dean & Son, Ltd., London, England, has just been issued.

Being in its 46th year of issue it has now appeared in the reigns of five British Sovereigns, and the international character of this Red Book of the Paper Industry renders it of special interest to all those engaged in the production, purchase, sale or distribution of paper, pulp and board, in the equipment of mill or factory, or in the supply of raw material in connection with the paper and allied trades, while its alphabetical arrangement makes it particularly easy of reference.

In it are given particulars of the paper and board mills of Great Britain and Ireland, and similar details concerning the paper, pulp and board mills in British Dominions overseas and in the foreign countries; many useful lists connected with British paper trades; a comprehensive list of Mill productions, arranged alphabetically in three ways:—(1) class of goods manufactured under more than 400 trade headings; (2) country of origin; (3) name of firm, and a classified index forming a buyers' guide.

The Paper Makers' Directory of All Nations may be ordered at $7.50 per copy from the Lockwood Trade Journal Company, 15 West 47th Street, New York.

F. C. Huyck & Sons Reopen

[FROM OUR REGULAR CORRESPONDENT]

RENSSELAER, N. Y., August 7, 1937—The mills of F. C. Huyck & Sons reopened this week after the annual vacation period. During that time the annual inventory was taken and improvements and repairs to plant made. Several hundred employees enjoyed the annual shutdown.

HIGHEST GRADE

CLAYS

COATING FILLING

POWDERED

THE DRAPER FELTS

All kinds and styles of Felts for all kinds and styles of Papers.

Write us about your Felt problems and let us help you reduce your Felt Costs—we will call anywhere at any time.

DRAPER BROS. COMPANY

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Woolen manufacturers since 1856

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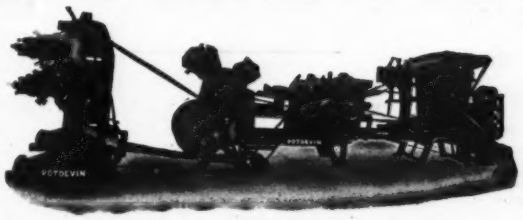

Aniline Printing
Self-Opening Square Paper Bag Machine

For over 40 years our customers' desires have been our guide. We have worked hand in hand, ever seeking a better method, a finer job.

Numerous new machines, new combinations, many improvements, have resulted from this coalition.

Thus, today, whether in the building of bag machines, printing presses, waxing machines, or other paper converting units, the name POTDEVIN stands out as leader.

PAPER BAG MCHY., PRINTING PRESSES, WAXERS, VARNISHERS, GLUERS, SPECIAL MCHY.

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Accelerated Weathering Tests of Mineral-Surfaced Asphalt Shingles

Recent tests by H. R. Snoke and B. E. Gallup of the National Bureau of Standards, on mineral-surfaced asphalt shingles, show that all of the types of failure encountered in long outdoor exposures to the most severe weather conditions can be produced by accelerated weathering in 7 months or less.

As reported in RP1002 in the *Journal of Research* for June, 39 samples of standard-weight shingles, from eight of the larger manufacturers, and including the natural and artificial granular surfacing materials most commonly used, were included in the test. Except that the samples containing fine mineral filler in the asphalt coatings appear to be the most resistant to weathering, analyses of the samples under test including fiber analyses of the felts and petrographic examination of the mineral fillers and fine surfacing materials, show no differences in composition sufficiently great to warrant the prediction of decided differences in their behavior to weathering.

Out doors exposures of these shingles normally require from 10 to 20 years to produce definite results, and consequently are of little value in predicting the behavior to weathering of materials currently available, since raw materials and manufacturing processes are constantly changing. The accelerated weathering test should therefore be of considerable value, not only to purchasers of large quantities of these materials, but to manufacturers, as a means of improving their products. The test is made by exposing the samples to continuous light and heat from a carbon-arc lamp, with intermittent water spray, then examining them for color changes, blistering, pitting and loss of granules.

Copies of Research Paper 1002 can be secured from the Superintendent of Documents, Government Printing Office, Washington, D. C., for ten cents each.

Resistance of Building Boards and Papers to Deterioration to be Studied

With a part of a fund appropriated to the National Bureau of Standards for a general study of building materials relative to low-cost housing projects, the Paper Section is undertaking an investigation of the resistance of various types of fibrous building materials to deteriorative influences.

Insulating boards, boards used for outside and for interior finish, and sheathing papers, are all to be included in the study. The materials are to be subjected to accelerated aging by carrying them through cycles of change in temperature and humidity, with exposure to strong light such as that from a carbon arc. The effects of such influences will be found by measurements for distortion, expansion and contraction, and by testing for decrease in strength and moisture resistance, mold growth, and in other ways.

It is believed that this investigation will supply some information which is greatly needed to permit the house builder to make intelligent choice between the different types of these materials and to know whether he can profitably substitute some of them for more expensive materials.

Two research workers are being added to the staff for this work.

BROWN COMPANY REORGANIZATION PLANS

(Continued from page 13)

lacquers, plastics, explosives and many other allied trades for which sulphite and alpha cellulose pulp are among the principal raw materials, has made a substantial increase in plant capacity essential. In 1937 the company was compelled to buy from outside mills about 25,000 tons of rayon pulp and orders for more than 10,000 tons have to be carried over into 1938 because of inability to deliver to customers this year.

"It is essential that the capacity of the plant at La Tuque, P. Q., be increased from 300 tons a day to 600 tons. The Canadian Company now holds timber limits ample to provide a sustained or perpetual supply of excellent wood for the larger capacity; it also has available, at lowest price, ample supplies of power; the fresh water supply is already installed for the larger capacity; the mill site was selected and laid out for a 600-ton mill many years ago; and the present mill itself was designed to be a part of the larger mill development.

"The result of these circumstances, planned far in advance, is that the present mill, power facilities and timberland assets, which cost about $16,000,000, can be doubled in capacity including a chlorine plant and supplied with ample working capital at a cost of about $6,500,000."

A table showing the proposed changes in capital structure follows:

	Present	To be Authorized	To be Immediately Issued Under the Plan
Bonds	$21,415,500	Per the exist'g indenture	$21,415,500
Notes		$750,000*	$750,000*
Convertible Notes		$8,500,000	$6,000,000
Preferred Stock	100,000 Shrs.	135,000 Shrs.	120,000 Shrs.
Common Stock	400,000 Shrs.	3,000,000 Shrs.	2,000,000 Shrs.
New Canadian Bonds		$6,500,000	$6,500,000
Old Canadian Bonds	$3,821,000	$3,821,000**	$3,821,000
Common Stock of Canadian Co.	$14,000,000	$14,000,000**	$14,000,000

* Approximately.
** Presently outstanding.

Quaker City Paper Issues Price List

[FROM OUR REGULAR CORRESPONDENT]

PHILADELPHIA, Pa., August 9, 1937—A new and unusual 42-page price list has just been compiled by the Quaker City Paper Company under the direction of W. B. Killhour, president. Accompanying the price list is a setup of 20 sample folder pockets, size 8½ by 11, which fit into the sample cabinet. Each folder is tabbed and marked for particular grades or types of printing papers such as blottings, sulphite bonds and ledgers, rag content bonds and ledgers, uncoated book, covers, etc. These folders fit into the company's specially developed sample cabinet but in the event that the printer customers care to, they are so adapted as to regulation size that they can use them in a standard letter file cabinet.

Quaker City Paper Company established in 1905 was primarily a wrapping paper house, but fine paper has made such inroads on their sales that Mr. Killhour states it was incumbent on them to compile this new price list, which reflects the development of their fine paper department. The price list is printed on Substance 36 Collins General Ledger and enclosed in tweed finish, henna Interwoven double thick cover. The index is printed on 50 lb. antique Interwoven Cover and the binding is called Cercla.

"You can rely on it— if it's ZOPAQUE it's opaque!"

Yes... it's the most outstanding of all white fillers! ZOPAQUE is a *pure titanium dioxide*. Chemically pure and stable, it challenges comparison for *whiteness* and *opacity*.

AVAILABLE IN THREE GRADES:
SD—STANDARD GD—WATER DISPERSION
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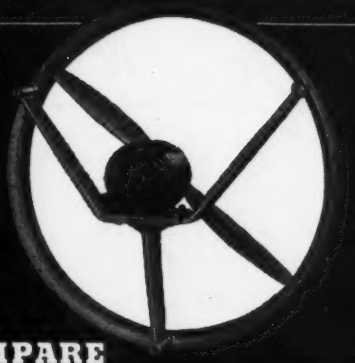

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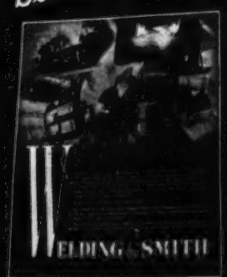

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EXCELSIOR Knox Woolen Co. Camden, Me. FELTS & JACKETS

HIGH POROSITY

. . . as a characteristic of a paper maker's felt will, not only add to the life of felt, but saves time lost on the machine due to excessive shut downs for washing. Specify

EXCELSIOR FELTS

and minimize this trouble. Made by the Knox Woolen Co., of Camden, Maine, since 1864.

BULKLEY, DUNTON & CO.
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New York Market Review

Office of the PAPER TRADE JOURNAL,
Wednesday, August 11, 1937.

The situation in the paper industry continued normal for the season, with improvement noted in some quarters and prices strong. Bonds, ledgers, book papers and book covers moved fairly well. With the candy factories opening, there was an increased demand for fancy papers to be used in box covering.

Newsprint was in the usual demand, with shipments made in good volume. Wrapping paper moved in moderate volume. Seasonal business, such as that in paper cups, was lively.

Box board is somewhat draggy, but there are indications of improvement. Box manufacturers are anticipating a good fall business.

Chemical Pulp

In the chemical pulp market, matters are comparatively quiet at the present time but, in spite of this, the demand for bleached sulphite is still brisk enough to facilitate quick sales on any tonnage available at about regular contract prices.

Mechanical Pulp

The tone of the mechanical pulp market is fairly firm and some consumers are reported to have covered most of their requirements for some time ahead at prevailing prices, which might indicate that such buyers might be apprehensive lest conditions should develop similar to those which have prevailed in the chemical pulp market for some time past.

Old Rope and Bagging

There was very little trading this week in old rope. The demand for domestic and foreign manila is now firm. The condition of the scrap and gunny bagging market is steadier. Prices remain the same.

Rags

The domestic market is not very active, although it is expected that an increase in trading will be manifested either the end of this month or the beginning of September. Old whites are selling better than the rag market as a whole. Prices conform with the previous ruling market levels.

Waste Paper

Trading is stronger, with both the better and the board grades in continuing increased demand. Scheduled prices are firm, but it is reported that actual trading levels are above established prices.

Twine

Twines are moving in good volume, with a favorable demand for jute, hemp, sisal and others. Prices continue firm in these grades. Cotton twine has been showing a declining tendency, on account of the forecast of increased production of cotton by the Cotton Reporting Board.

Government to Appeal Paper Case

The United States Customs Court has decided that paper in 15 inch rolls, imported by a Buffalo commercial printer for the production of give-away advertising publications called newspapers, is duty free as standard newsprint. The Government officials have decided to appeal the case. Meanwhile six additional shipments have been taken to Court by the importers in protest against the collection of duty. In the *Christian Science Monitor* case the lower court held the paper to be standard newsprint but was overruled on appeal.

Protests were filed with the United States Customs Court at Ogdensburg against the imposition of duty on 20-inch side runs but were later abandoned.

Three shipments of green and peach paper in 14 inch rolls which were held dutiable at Maline, New York, have been taken to the United States Customs Court on protest by the Pictorial Review Pattern Company, which claims the paper is duty free as standard newsprint.

Correction

The Western Board and Paper Company was bought by the Detroit Paper Products Corporation, not the Detroit Paper Products Company, as stated in a recent issue of the PAPER TRADE JOURNAL. It was stated also that Walter B. Hadley, chief engineer of the Kalamazoo Division of the Detroit Paper Products Corporation had been manager of the Pioneer Flintkote Company at Los Angeles, Cal. This was in error as Mr. Hadley was not manager of the company, but had been associated with that concern at Los Angeles.

Government Paper Awards

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., August 11, 1937—The Old Dominion Paper Company will furnish the Government Printing Office with 9,900 pounds (75,000 sheets) of 26 x 34, 50 per cent rag white bond paper at 14.988 cents per pound, bids for which were received on July 12.

The Enterprise Paper Company will furnish 5,000 pounds of No. 1 gummed kraft paper in 24½-inch rolls at 9.555 cents per pound, bids for which were received on July 2.

Let us take care of your REJECTIONS, over-runs or seconds.

We have branches in fourteen different cities and can sell your rejections for you at a minimum expense to you; wherever they occur.

THE SABIN ROBBINS PAPER COMPANY

STATION A CINCINNATI, OHIO

The ORIGINAL self-dispersing Pigment Blues for tinting:

NYCO

LIQUID BLUES

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OUTSTANDING—but only one series of the NYCO complete line of selected colors for the Paper Manufacturer.

● Consult NYCO when you have a color problem ● Our laboratory facilities are at your disposal ●

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MACHINE FINISHED BOOK
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Offset, Envelope, Bond, Writing, Mimeograph, Ledger, Cover and Music Papers, Index Bristol, Post Card and Label Papers

HIGH GRADE COATED BOOK

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KRAFT WRAPPING AND KRAFT ENVELOPE.
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BLEACHED SULPHITE AND SODA PULP.
BLEACHED AND UNBLEACHED KRAFT PULP.

MILLS:

Mechanicsville, New York
Luke, Maryland
Covington, Virginia
Tyrone, Pennsylvania
Williamsburg, Pennsylvania
Cass, West Virginia

GIANT RAG CUTTERS

TAYLOR, STILES & COMPANY

RIEGELSVILLE, N. J.

Pulp and Paper Mill Screens

Of Stainless Steel—Copper—Bronze—Monel—Chemical Resisting Alloys

Perforations that are accurate in size

Any Metal Any Perforation

The Harrington & King Perforating Co.

5652 Fillmore St., Chicago, Ill. 114 Liberty St., New York, N.Y.

Miscellaneous Markets

Office of the PAPER TRADE JOURNAL,
Wednesday, August 11, 1937.

BLANC FIXE—Conditions in the blanc fixe market are quiet. Prices are the same as formerly quoted levels. Pulp is now offered at from $42.50 to $45 per ton, in bulk, while the powder is being offered at from 3½ to 3¾ cents per pound, in barrels, at works.

BLEACHING POWDER—The condition of the bleaching powder market remains very active, which is the normal situation for the season. The contract movement is regular. Prices are generally maintained at previously quoted levels. Bleaching powder is offered at from $2 to $2.25 per 100 pounds, in drums, at works.

CASEIN—The casein market remains the same as previous. Domestic standard ground casein is selling at from 13 to 14 cents per pound, while domestic finely ground casein is quoted at from 13½ to 14½ cents per pound, all in bags, car lot quantities.

CAUSTIC SODA—The caustic soda market remains satisfactory. The contract movement is normal. Solid caustic soda is quoted at from $2.10 to $2.30, while flake and ground are selling from $2.50 to $2.70 per 100 pounds, in drums, at works.

CHINA CLAY—Trading in the china clay market is quite buoyant. Contract shipments are moving favorably. Imported china clay is quoted at from $14.50 to $25 per ton, ship side, while domestic paper making clay is selling at from $6.50 to $12 per ton, at works.

CHLORINE—The chlorine market is extremely active. The contract movement conforms with the usual seasonal demand. Generally, prices comply with previously quoted levels. Chlorine is quoted at $2.15 per 100 pounds, in single-unit tank cars, f.o.b., at works.

ROSIN—The rosin market is firm. Paper making rosin is now quoted at $7.80 and wood rosin at $7.90 per 280 pounds, gross weight, in barrels, at Savannah. Seventy per cent rosin size is selling at $3.60 per 100 pounds, in tank cars, at works.

SALT CAKE—The condition of the salt cake market is firm. Salt cake is quoted at from $12 to $13; chrome salt cake at from $10 to $11, f.o.b. shipping point, while imported salt cake is selling at $12, Gulf or Atlantic Seaboard, on dock.

SODA ASH—The soda ash market is quite active. Demand from the paper mills remains persistent. Prices are similar to previous levels. Quotations on soda ash, in car lots, at works, per 100 pounds, are as follows: in bulk, $.90; in bags, $1.05; and in barrels, $1.35.

STARCH—The condition of the starch market is inactive. Prices are much lower. Paper making starch is now quoted at $3.45 per 100 pounds in bags, and at $3.70 per 100 pounds, in barrels, at works.

SULPHATE OF ALUMINA—The sulphate of alumina market remains strong. Contract shipments are moving in good volume. Prices are steady. Commercial grades are quoted at from $1.25 to $1.60, while iron free is selling at from $2 to $2.25 per 100 pounds, in barrels, at works.

SULPHUR—The demand for sulphur remains firm. Yearly contracts are quoted at $18 per long ton on orders of 1,000 tons or over. On spot and nearby car loads the quotations are $21 per ton. All quotations are in car lots, at works.

TALC—Activity in the talc market continues at a favorable pace. There has been no change in the ruling market levels. Domestic talc is quoted at from $15 to $18 per ton, at eastern mines, while imported talc is selling at from $23 to $30 per ton, on dock.

Market Quotations

Paper

Tissues—Per Ream—

White No. 1	1.10	@	—
White No. 1 M. G.	1.07½	@	—
White No. 1½	.77½	@	—
White No. 2	.75	@	—
Anti-Tarnish M. G.	.77½	@	—
Colored	.90	@	—
Kraft	.77½	@	—
Manila	.75	@	—
Unbleached Toilet	2.60	@	3.30
Bleached Toilet	3.94	@	5.26

Paper Towels—

Unbleached	2.10	@	3.35
Bleached	3.30	@	3.70

Manila—

No. 1 Jute	9.00	@	9.25
No. 2 Jute	7.75	@	8.50
No. 1 Wood	4.00	@	5.25
No. 2 Wood	3.50	@	4.00

Fibre Papers—

No. 1 Fibre	4.25	@	5.50
No. 2 Fibre	4.00	@	4.75

(Delivered New York)

News, per ton—

Roll, contract	42.50	@	—
Sheets	47.50	@	—

Kraft—

No. 1 Northern	5.25	@	5.75
Standard	5.00	@	—
Southern	5.00	@	—
Glazed	4.50	@	—
Striped	4.75	@	—

Boards, per ton—

News	47.50	@	—
Chip	45.00	@	—
Sgl. Mla. Lt. Chip	55.00	@	—
Jute Lined Chip	55.00	@	—
Kraft Liners	65.00	@	—
White Pat. Coated	67.50	@	—
Binders Boards	75.00	@	80.00

The following are representative of distributors' resale prices:—

Rag Content Bonds and Ledgers—
White, Assorted Items,
Delivered in Zone 1:

	Bonds	Ledgers
100% Rag Ext. No. 1	$41.40@$48.50	$42.55@$50.00
100% Rag	32.80@ 38.50	33.95@ 39.75
85% Rag	.....	32.20@ 37.75
75% Rag	24.75@ 29.00	25.90@ 30.50
65% Rag	21.65@ 26.25	22.80@ 27.75
50% Rag	18.70@ 22.75	19.90@ 24.25
25% Rag	15.80@ 19.25	16.95@ 20.75

Regular Colors @ $1.50 cwt. extra.
Heavy Colors @ $3.00 cwt. extra

Sulphite Bonds and Ledgers—
White, Assorted Items,
Delivered in Zone 1:

	Bonds	Ledgers
No. 1	$9.35@$11.50	$10.55@$12.75
No. 2	8.50@ 10.25	9.65@ 11.75
No. 4	7.60@ 9.25	8.80@ 10.75

Regular Colors @ $1.50 cwt. extra.
Heavy Colors @ $3.00 cwt. extra.

Free Sheet Book Papers—
White, Cased Paper,
Delivered in Zone 1:

No. 1 Glossy Coated	$12.45	@$14.25
No. 2 Glossy Coated	10.80	@ 12.25
No. 3 Glossy Coated	9.65	@ 11.00
No. 4 Glossy Coated	9.05	@ 10.50
No. 1 Antique (watermarked)	9.05	@ 10.50
No. 2 Offset	8.35	@ 9.50
A Grade E. F.	8.20	@ 9.50
A Grade S. & S. C.	8.45	@ 9.75
B Grade E. F.	7.60	@ 8.75
B Grade S. & S. C.	7.85	@ 9.00
C Grade E. F.	7.30	@ 8.50
C Grade S. & S. C.	7.55	@ 8.75
D Grade E. F.	7.00	@ 8.25
D Grade S. & S. C.	7.25	@ 8.50

Ivory & India at $.50 cwt. extra.

Mechanical Pulp

(On Dock, Atlantic Ports)

No. 1 Imported—

Moist	35.00	@	36.00
Dry	40.00	@	42.00

(Delivered)

No. 1 Domestic and Canadian	36.00	@	37.50

Chemical Pulp

(On Dock, Atlantic, Gulf and West Coast Ports)

Bleached Sulphite (Domestic and Foreign)—

Prime Bleached Sulphite	3.25	@	4.65

Prime Qualities—

Easy-Bleaching Sulphite	3.50	@	4.00
Strong Unbleached Sulphite	3.25	@	3.65

(On Dock, Atlantic Ports)

Kraft Bleached	4.00	@	4.75
Kraft Light & Strong	3.00	@	3.75
Kraft No. 1	2.90	@	3.65
Kraft No. 2	2.50	@	2.75

(F.o.b. Pulp Mill)

Kraft Domestic	2.75	@	3.25

(Delivered)

Soda Bleached	3.15	@	—

Add 60 cents per short ton, dock charges, for Albany; $2.00 for Lake Ports East and $3.00 for Lake Ports West of Mackinac Straits.

Domestic Rags

New Rags

(Prices to Mill f. o. b. N. Y.)

Shirt Cuttings—

New White, No. 1	9.00	@	9.25
Silesias, No. 1	6.75	@	7.00
New Unbleached	9.25	@	9.50
Blue Overall	7.25	@	7.50
Fancy	3.75	@	4.25
Washables	2.75	@	3.25
Mixed Khaki Cuttings	4.25	@	4.50
O. D. Khaki Cuttings	4.75	@	5.00

Old Rags

White, No. 1—			
Repacked	3.75	@	4.25
Miscellaneous	3.00	@	3.25
White, No. 2—			
Repacked	2.60	@	2.85
Miscellaneous	2.00	@	2.25
Thirds and Blues—			
Repacked	2.00	@	2.25
Miscellaneous	1.90	@	2.00
Roofing Rags—			
No. 1	Nominal		
No. 2	1.20	@	1.30
No. 3 (bagging)	.90	@	1.00
No. 4	.90	@	1.00
No. 5A	.75	@	.85

Foreign Rags

New Rags

New Dark Cuttings	Nominal
New Mixed Cuttings	Nominal
New Light Silesias	Nominal
Light Flanneletts	Nominal
New White Cuttings	Nominal
New Light Oxfords	Nominal
New Light Prints	Nominal

Old Rags

No. 1 White Linens	Nominal
No. 2 White Linens	Nominal
No. 3 White Linens	Nominal